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AEROSPACE MEDICINE AND BIOLOGY

A CONTINUING BIBLIOGRAPHY

WITH INDEXES

(Supplement 145)

SEPTEMBER 1975

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

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AEROSPACE MEDICINE AND BIOLOGY

A CONTINUING BIBLIOGRAPHY WITH INDEXES

(Supplement 145)

A selection of annotated references to unclassified reports and journal articles that were introduced into the NASA scientific and technical information system and announced in August 1975 in

- *Scientific and Technical Aerospace Reports (STAR)*
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Scientific and Technical Information Office
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INTRODUCTION

This Supplement to *Aerospace Medicine and Biology* (NASA SP-7011) lists 343 reports, articles and other documents announced during August 1975 in *Scientific and Technical Aerospace Reports (STAR)* or in *International Aerospace Abstracts (IAA)*. The first issue of the bibliography was published in July 1964, since that time, monthly supplements have been issued.

In its subject coverage, *Aerospace Medicine and Biology* concentrates on the biological, physiological, psychological, and environmental effects to which man is subjected during and following simulated or actual flight in the earth's atmosphere or in interplanetary space. References describing similar effects of biological organisms of lower order are also included. Such related topics as sanitary problems, pharmacology, toxicology, safety and survival, life support systems, exobiology, and personnel factors receive appropriate attention. In general, emphasis is placed on applied research, but references to fundamental studies and theoretical principles related to experimental development also qualify for inclusion.

Each entry in the bibliography consists of a bibliographic citation accompanied in most cases by an abstract. The listing of the entries is arranged in two major sections: *IAA Entries* and *STAR Entries*, in that order. The citations, and abstracts when available, are reproduced exactly as they appeared originally in *IAA* or *STAR*, including the original accession numbers from the respective announcement journals. This procedure, which saves time and money, accounts for the slight variation in citation appearances.

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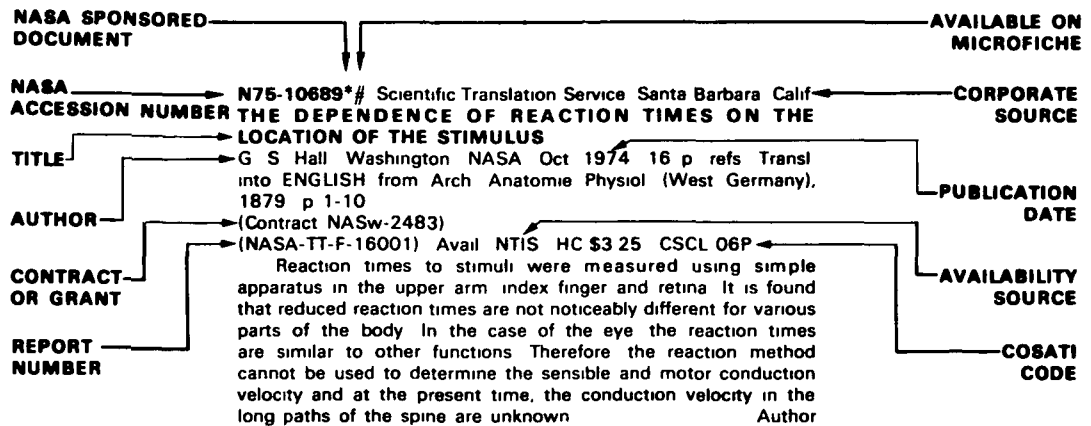
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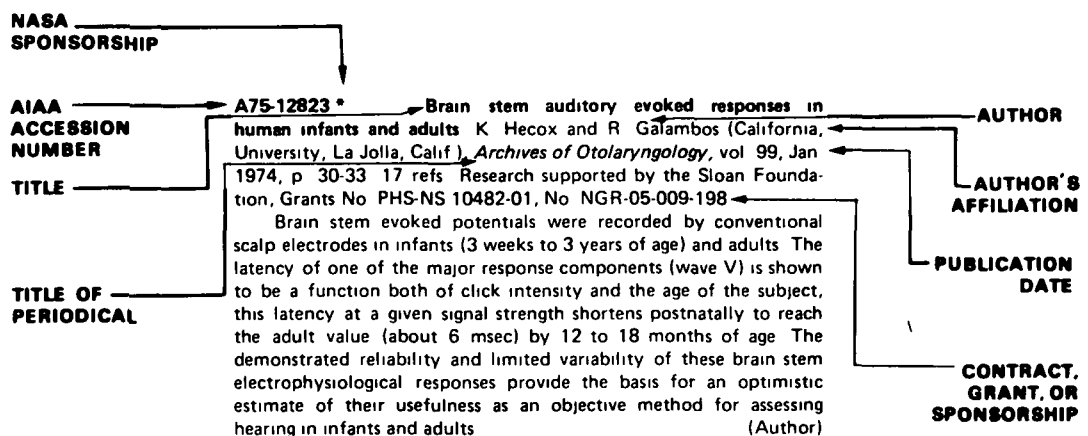
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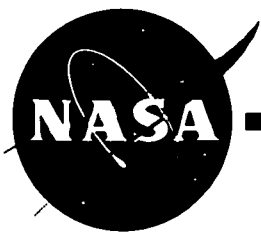
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AEROSPACE MEDICINE AND BIOLOGY

A Continuing Bibliography (Suppl. 145) SEPTEMBER 1975

IAA ENTRIES

A75-32408 Electromagnetic power absorption in anisotropic tissue media. C C. Johnson, C. H. Durney, and H. Massoudi (Utah, University, Salt Lake City, Utah) *IEEE Transactions on Microwave Theory and Techniques*, vol MTT-23, June 1975, p 529-532 USAF-supported research

Strong dielectric-constant anisotropy exists in muscle tissue at the lower microwave frequencies. Based on a model derived from tissue measurements, an analysis is carried out for single and multiple tissue layers. Calculated effects of tissue anisotropy on microwave fields and power absorption in the tissues are presented (Author)

A75-32411 Defining synthetics M. Ferrol *Shell Aviation News*, no 427, 1975, p 11-13

An organization desiring to obtain a flight simulator must choose it after deciding on the specific type of training for which it is to be used. Emphasis is placed on the importance of choosing good instructors who are up to date in their knowledge of aircraft operation and teaching techniques. Simulators provide a potential for flexibility and individualized instruction which should be realized in the training program. A T S

A75-32412 * Light flashes observed by astronauts on Skylab 4. L. S. Pinsky (Houston, University, Houston, Tex.), W. Z. Osborne, R. A. Hoffman, and J. V. Bailey (NASA, Johnson Space Center, Houston, Tex.) *Science*, vol 188, May 30, 1975, p 928-930 11 refs

Two dedicated light flash observing sessions were conducted by one of the crewmen during the Skylab 4 mission. Analyses of his observations reveal a strong correlation between flash frequency and primary cosmic-ray flux, and an even stronger correlation between flash frequency and the South Atlantic Anomaly (SAA) region of the inner belt trapped radiation. Calculations indicate that an all-proton inner belt probably cannot produce the observed SAA flash rate, and they suggest that there may exist a previously unobserved inner belt flux of multiply charged nuclei (Author)

A75-32414 Control of performance in a multi-element repetitive task. C. G. Drury and E. N. Corlett (Birmingham, University, Birmingham, England) *Ergonomics*, vol 18, May 1975, p 279-298 17 refs. Research supported by the Science Research Council

This research is the latest part of a series of studies of the functioning of higher-level control loops in the motor-control

hierarchy. Previous experiments had shown that this control level could be studied by analyzing and modelling the sequential dependencies between performance on successive cycles of a repetitive motor-control task. The present research applies the previously developed methods to a repetitive motor task having four elements per cycle, rather than one or two elements as studied previously. The effects of visual vs blind control and practice at the task are examined. The previously-developed first order autoregressive model again fitted the results well and the effects of vision and practice are examined in terms of parameters of this model. The sequential dependencies found in this task were generally lower than those found in previous studies. It was also found that sequential dependencies decreased with both visual control and practice at the task. Conclusions from both the current and previous research are presented (Author)

A75-32415 Oxygen consumption and heart rate - Changes and relationships in static work. A. Wald and L. B. Harrison (New York University, New York, N.Y.) *Ergonomics*, vol 18, May 1975, p 299-309 12 refs. Grants No. PHS-5-T01-OH-00103, No. NIH-NS-073-066

Oxygen consumption and heart rate were measured periodically during three levels of static work, and in the recovery phase. The recorded results of the steady-state or plateau value for oxygen consumption and for heart rate were fitted to an exponential-curve mathematical model. For nonfatiguing tasks, an actual plateau was reached. For a fatigue-causing task, no actual plateau was reached, a virtual plateau was calculated. For both oxygen consumption and heart rate, the plateau value, difference between initial and plateau value, and percent relative stress, all showed significant differences between task-pairs. These parameters were also found to be linearly correlated. For oxygen consumption, the rise time for the light task was significantly shorter than that for the moderate and heavy tasks. For heart rate, rise time was found to be significantly shorter as the task load increased. Fall time for heart rate decreased with increased task intensity (Author)

A75-32458 Exobiology sensors. S. J. Hynes *Spaceflight*, vol 17, June 1975, p 212, 213, 240

Exobiology is the science concerned with studies related to extraterrestrial life. There is currently no knowledge of any life forms beyond those found on earth. Approaches for detecting extraterrestrial life, if it exists, are discussed. The design of suitable detection methods concerning life on other planets is made difficult by a lack of any knowledge of the forms and the characteristics of extraterrestrial life. The properties of life on earth are examined in an attempt to deduce some general characteristics which might also be applicable to extraterrestrial life. G R

A75-32501 # The changes of some components of the evoked response in man during a voluntary movement (Izmeneniia

otdel'nykh komponentov vyzvannogo potentsiala v svyazi vypolneniem prostogo dvizheniya) M S Zalkind, E I Koz'mian, and A V Naidel' (Akademiya Nauk SSSR, Institut Problem Peredachi Informatsii, Moscow, USSR) *Fiziologicheskii Zhurnal SSSR*, vol 61, Apr 1975, p 518-529 40 refs In Russian

Various moments of preparation and performance of a simple voluntary movement were tested in man with the aid of somatosensory, auditory, and visual evoked responses. An obvious attenuation of somatosensory responses closely related to the movement but independent of the spontaneous EEG changes and unaffected by the ischaemic deafferentation of the active limb, was observed. The time course of the amplitude changes was different for separate components of the same evoked response. The evoked response to stimulation of the inactive limb and the auditory evoked response changed also, while the visual evoked response remained unchanged. The described changes cannot be explained by changes in the transmission via the specific pathways. The changes in the response of early components are supposed to manifest facilitation or activation of the sensory-motor cortical neurons, and those of the late, generalized complex - a decrease in the ascending message from unspecific structures (Author)

A75-32502 # Relation between biochemical changes prior to exercise and characteristics of the metabolism during muscular activity (Sviaz' mezhu predrabochimi biokhimičeskimi izmeneniyami i osobennostami metabolizma pri myshechnoi deiatel'nosti). A F Krasnova, R I Lenkova, L V Maksimova, N R Chagovets, N N Iakovlev (Leningradskii Nauchno-Issledovatel'skii Institut Fizicheskoi Kul'tury, Leningrad, USSR), and L G Leshkevich *Fiziologicheskii Zhurnal SSSR*, vol 61, Apr 1975, p 530-536 14 refs. In Russian.

A75-32503 # Convergence and interaction of visceral, somatic, and visual stimuli on single neurons of the external geniculate bodies in cats (Konvergentsiya i vzaimodeistvie vistseral'nykh, somaticheskikh i zritel'nykh vozbuzhdenii na odinochnykh neuronakh naruzhnykh kolenchatykh tel koshki) N I Pityk, V S Raitses, and M M Khananashvili (Ivano-Frankovskii Meditsinskii Institut, Ivano-Frankovsk, Ukrainian SSR, Akademiya Meditsinskikh Nauk SSSR, Leningrad, USSR) *Fiziologicheskii Zhurnal SSSR*, vol 61, Apr 1975, p 537-545 45 refs In Russian

A75-32504 # The rhythm of physiological changes in the functional state of the visual and dermothermal analyzers in man (O ritmike fiziologicheskikh izmenenii funktsional'nogo sostoiانيا zritel'nogo i kozhnotemperaturnogo analizatorov cheloveka). L M Kurilova (Akademiya Meditsinskikh Nauk SSSR, Moscow, USSR). *Fiziologicheskii Zhurnal SSSR*, vol 61, Apr 1975, p 554-562 25 refs In Russian.

A75-32505 # Subliminal fringe of the motoneurone pool of the soleus muscle in man during rest and stimulation (Podporogovaya kaima motoneuronnogo pula kambalovidnoi myshtsy v usloviakh ego pokoia i vozbuzhdeniya u cheloveka) A D. Pshedetskaia (Petrozavodskii Gosudarstvennyi Universitet, Petrozavodsk, USSR) and M Kh Starobinets (Gorodskaya Bol'nitsa, Petrozavodsk, USSR) *Fiziologicheskii Zhurnal SSSR*, vol 61, Apr 1975, p 563-568 16 refs In Russian.

H-reflex was recorded in healthy subjects by using short interval (2-30 msec) double volleys. Maximal ratio of testing and conditioning of H-reflexes showed motoneurone pool subliminal fringe value. In conditions of spinal center stimulation the subliminal fringe increased. The same changes were observed when subliminal conditioning stimulus was used, but facilitation of H-reflex testing in this case was not statistically significant (Author)

A75-32506 # On the possible role of potassium ions in regional cerebral blood flow control (O vozmozhnom uchastii ionov kalia v regulatsii mestnogo mozgovogo krovotoka) I T Demchenko, S V Burov, and A N Derii (Akademiya Nauk SSSR, Institut Evoliutsionnoi Fiziologii i Biokhimii, Leningrad, USSR) *Fiziologicheskii Zhurnal SSSR*, vol 61, Apr 1975, p 577-584 26 refs In Russian

The microinjections of mock spinal fluid with various potassium concentrations into the cat and monkey brain tissue were made in acute and chronic experiments. The vascular reactions as studied with the microphotography and H-clearance method were found to be linearly related to the potassium concentrations within the range of 0-12 mEq/l, being constricting below 5 mEq/l and dilatory above that. An interaction between MSF potassium and pH seems to be weak if any, since the slope of the potassium vascular activity diagram remains unchanged within 6.8-7.8 pH change. The data obtained suggest that potassium ions take part in rCBF control since potassium is known to escape from stimulated nerve cells and thus substantially increase an extracellular potassium concentration (Author)

A75-32507 # Man's perception of his own respiratory volume (O vospriyatii chelovekom svoego dykhatel'nogo ob'ema). I S Breslav, A G Zhironkin, and A M Shmeleva (Akademiya Nauk SSSR, Institut Fiziologii, Leningrad, USSR) *Fiziologicheskii Zhurnal SSSR*, vol 61, Apr 1975, p 593-599 20 refs In Russian

In young healthy subjects, the ability of correct estimation of own respiratory volume and of rather exact reproduction of its given value, was shown. However, during artificial increase in the resistance to breathing, the subjects perceive the respiratory volume as greater than the actual one and, having been told to decrease the respiratory volume, reduced it to a greater than necessary extent. An opposite phenomenon was noted upon reducing the resistance to respiration. Moderate hypoxia and, particularly, hypercapnia evoked involuntary exaggeration of asked respiratory volume while hyperoxia evoked its reducing. The data obtained suggest that the main source of sensations associated with a respiratory act is the afferent projection from the proprioceptors of respiratory muscles, which reflects the value of inspiratory effort. The perception of respiratory volume may be distorted by changes of projections from chemoreceptors participating in regulation of breathing (Author)

A75-32508 # The dynamics of the respiratory indices of arterial blood, cerebrospinal fluid, and tissue in the region of the bulbar respiratory center under conditions of hypoxia (Dinamika dykhatel'nykh pokazatelei arterial'noi krovi, likvora i tkani oblasti bul'barnogo dykhatel'nogo tsentra pri gipoksii) E A Iumatov (I Gosudarstvennyi Meditsinskii Institut, Moscow, USSR) *Fiziologicheskii Zhurnal SSSR*, vol 61, Apr 1975, p 600-609 31 refs In Russian

A75-32526 # Experimental investigation of the effect of reflected laser radiation on the organ of vision (Eksperimental'nye issledovaniya deistviia otrazhennogo lazernogo izlucheniia na organ zreniia). A B Butman, Iu P Gudakovskii, R I Kovach, and A I Semenov (Voenno-Meditsinskii Zhurnal, Mar 1975, p 53-55 In Russian)

The injurious effect of high-energy radiation from a 0.69-micron pulsed laser, diffusely reflected from a nonspecular surface, on a rabbit's eye with uniformly pigmented fundus oculi is studied experimentally. It is found that the effect of such a radiation on the rabbit's eye situated at a distance less than 80 cm from the reflecting surface results in damage to the fundus oculi tissues in the form of chorioretinal focuses. The size of chorioretinal focuses is observed to diminish almost linearly as a function of the distance of the eye from the reflecting surface. It is also found that by the twentieth day after the first damaging of the eye, the damage site takes the form of an atrophic pigmented focus with diffused boundaries S D

A75-32528 # Characteristics of medical care for crews of shipborne helicopters operating from a single base (Osobennosti meditsinskogo obespecheniia ekipazhei korabel'nykh vertoletov pri odinochnom bazirovani) N P Shchemelev *Voenno-Meditsinskii Zhurnal*, Mar 1975, p 60-62 In Russian

The medical examination of shipborne helicopter crewmembers engaged in long-term voyages has revealed an instability of the pulse, an increase in the arterial blood pressure during the onboard adaptive period, a decrease in the functional capacity of the myocardium, weakening of the stimulating and predominance of the inhibiting processes in the brain, changes in the functional capacity of the visual and auditory analyzers, a decrease in muscular tonus, and other functional disorders. It has been shown that this variety of functional disorders depends strongly on the time spent by the crew on the ship. Ship physicians must therefore pay particular attention to the medical supervision of both the work-rest regime and nutrition of all crewmembers. It is imperative to submit the crew to a preflight medical examination on each flight day. S D

A75-32529 # Nystagmometers (Nistagmometry) I A. Sidel'nikov and N B Platonov *Voenno-Meditsinskii Zhurnal*, Mar. 1975, p 72-74 In Russian

Three types of instruments are developed for measuring the phase velocity, amplitude, and frequency of a nystagmus recorded on an electronystagmogram. The first instrument is a goniometer that consists of a triangular protractor and a hinged four member cursor whose end member is hinged at the vertex of the protractor, it is designed for measuring the angular inclination (with respect to the horizontal line) of the slow and rapid phases of nystagmus. The second instrument - a modified version of the first one - is intended to determine the phase velocity and the amplitude of a nystagmus by simultaneous measurement of the angular inclination of the slow and rapid phases of nystagmus in degrees and of the amplitude in millimeters. The last instrument is designed for measuring only the nystagmus amplitude and the number of nystagmic effects during a 5-sec interval of nystagmic reaction. The principles of operation of each type of nystagmometer are outlined. S D

A75-32575 * Recent NASA contributions to biomedical telemetry H Sandler, E P McCutcheon, T B Fryer, S Rositano, R Westbrook, and P Haro (NASA, Ames Research Center, Moffett Field, Calif) *American Psychologist*, vol 30, Mar 1975, p 257-264. 24 refs

The present work reviews technological progress over the past five years in the field of long-term telemetric monitoring of physiological parameters during space flight. Emphasis is placed on those developments that have direct application to animal or human use on earth. An effort was made in these recent developments to free subjects from encumbering wires: a swallowable telemetry capsule for monitoring body temperature and a wristwatch transmitter connected to EKG leads were two of the devices developed. S J M

A75-32600 # Catecholamines and contractile function of the myocardium during hypodynamia in addition to a changed thyroid-hormone balance (Katekholaminy i sokratitel'naiia funktsiia miokarda pri gipodinamii na fone izmenennogo balansu tireoidnykh gormonov) G M Pruss, V I Kuznetsov, and A A Zhilinskaiia (Vitebskii Gosudarstvennyi Meditsinskii Institut, Vitebsk, Belorussian SSR) *Akademiia Nauk SSSR, Izvestiia, Serii Biologicheskaiia*, Mar-Apr 1975, p. 187-195. 35 refs In Russian.

A75-32620 # Behavior of microorganism cells during the motion of a suspension in a nonuniform electric field (Povedinka klitin mikroorganizmiv pid chas rukhu suspensii v neodnorodnomu elektrichnomu poli) P I Gvozdiak (Akademiia Nauk Ukrain's'koi RSR, Institut Koloidnoi Khimii ta Khimii Vodi, Kiev, Ukrainian

SSR) *Akademiia Nauk Ukrain's'koi RSR, Dopovidy, Serii B Geologiiia, Geofizika, Khimii i Biologiiia*, Mar 1975, p 252-255 In Ukrainian

An experiment is described which investigated the main forces acting on microorganism cells in a suspension moving through a nonuniform electric field directed perpendicular to the suspension flow, and which studied the effects of maintaining the microorganisms in such a field. It was found that when the microbial suspension moves among silica gel grains in the electric field, its cells concentrate in places of grain contact, forming chain aggregates, and perform rotational motions. P T H

A75-32882 # Parametric study of the effect of large instrument panels on the thermal comfort of a space station crew G E Wilson (Martin Marietta Aerospace, Denver, Colo) *American Institute of Aeronautics and Astronautics, Thermophysics Conference, 10th, Denver, Colo, May 27-29, 1975, Paper 75-715* 8 p 13 refs

The unique environment experienced by personnel in spacecraft requires that particular attention be paid to the factors affecting their thermal comfort. Because astronauts must operate control panels for long periods of time, it becomes necessary to examine the effect of the panel on the crew member's comfort. This paper defines the parameters of concern and provides design charts that can be used to determine the comfortable combinations of atmosphere, wall and instrument panel temperatures. Construction of the design charts has been automated with a computer and plotter program. Details of this program are included. (Author)

A75-33075 Radiation biochemistry (Radiatsionnaia biokhimiia) Edited by E F Romantsev Moscow, Atomizdat (Sovremennye Problemy Radiobiologii Volume 4), 1975. 287 p In Russian.

A series of articles dealing with the main branches of contemporary radiation biochemistry, including problems of DNA synthesis and decomposition in an irradiated organism, the repair of DNA damage, radiation impairment of RNA, proteins, and carbohydrates, cell energetics, toxemia, and the formation of free radicals. Among the topics covered are enzymes in postirradiation DNA metabolism, radiation damage to RNA metabolism, blood glycoproteins during radiation sickness, radiation damage to lipid metabolism in cell-membrane structures, the role of the neuroendocrine system in metabolic shifts under the influence of ionizing radiation, and metabolic free radicals in animal tissues under normal conditions and during irradiation. A T S

A75-33158 Broad band spatial filters in the human visual system R Spitzberg (MIT, Lexington, Mass) and W Richards (MIT, Cambridge, Mass) *Vision Research*, vol 15, July 1975, p 837-841. 20 refs. Grant No. NIH-EY-00742, Contract No. F44620-69-C-0108

Two psychophysical techniques are introduced to uncover spatio-temporal filtering properties in the human visual system. These techniques draw upon analogies to the sustained and transient ganglion cells first reported by Cleland, Dubin and Levick (1971). The corresponding filters in man have spatial bandwidths exceeding four octaves with peak sensitivities near 1 and 12 c/deg. (Author)

A75-33159 Analysis of visual modulation sensitivity - Two components in flicker perception. C W Tyler (Bristol, University, Bristol, England) *Vision Research*, vol 15, July 1975, p 843-848. 27 refs. Science Research Council Grant No. B/SR/4836

An analysis of human psychophysical flicker thresholds is developed from the increment threshold technique of Stiles (1939). Two independent detection components are required to account for all available modulation sensitivity data. These components are differentiated by properties corresponding to the difference between sustained and transient units in the cat retina. (Author)

A75-33160 Optokinetic nystagmus as an objective indicator of binocular rivalry R Fox, S Todd, and L A Bettenger (Vanderbilt University, Nashville, Tenn) *Vision Research*, vol 15, July 1975, p 849-853 26 refs Grant No NIH EY-00590

When each eye is separately stimulated by moving contours that generate antagonistic opto-kinetic nystagmus, vigorous phenomenal rivalry results, yet the nystagmus eye movements remain yoked and shift direction in accord with the eye that is phenomenally dominant The feasibility of using this nystagmus rivalry as an indicator of phenomenal dominance was examined The high correlation between phenomenal report and nystagmus rivalry, together with stochastic and stimulus similarities between nystagmus rivalry and conventional rivalry, support using nystagmus as an objective indicator (Author)

A75-33161 Effect of binocular rivalry suppression on the motion aftereffect S W Lehmkuhle and R Fox (Vanderbilt University, Nashville, Tenn) *Vision Research*, vol 15, July 1975, p 855-859 27 refs Grant No NIH-EY-00590

The relative loci within the visual system of the site of the motion aftereffect (MAE) and the site of binocular rivalry suppression was inferred by measuring the magnitude of the MAE when the inducing motion was phenomenally suppressed for more than 50 per cent of the inspection period The MAE magnitude was a function of the duration of physical impingement of the inducing stimulus, the state of suppression exerted no effect, thereby implying that the site of suppression does not occur before the site of the MAE This result, together with other data, is interpreted to mean that the site of suppression is cortical (Author)

A75-33162 A technique to verify a range of adapting luminances in which rods contribute to thresholds determined with a short wavelength test stimulus J M Martinez, II and J F Sturr (Syracuse University, Syracuse, N Y) *Vision Research*, vol 15, July 1975, p 861-863 Grant No PHS-EY-00580

Preliminary tests of a new technique are described which permits reliable identification of the range of adapting luminances over which rods contribute to detection of a green test stimulus The technique involves the adaptive behavior and spectral tuning of extra-foveal cones The analysis is performed by examining log thresholds obtained with a red test probe viewed on a green adapting field as a function of log thresholds with a green test seen on a red adapting field S J M

A75-33163 Spectral sensitivity of the modulation-sensitive mechanism of vision - Effects of field size and retinal locus M H Bornstein (Yale University, New Haven, Conn, Max-Planck-Institut für Psychiatrie, Munich, West Germany) *Vision Research*, vol 15, July 1975, p 865-869 31 refs

A75-33164 Deterioration of vision due to contour shift over the retina during eye movements L Mitrani, N Iakimov, S Mateev (B'lgarska Akademiia na Naukite, Institut po Fiziologia, Sofia, Bulgaria), T Radil-Weiss, and V Bozkov (Czechoslovak Academy of Sciences, Institute of Physiology, Prague, Czechoslovakia) *Vision Research*, vol 15, July 1975, p 877, 878

A75-33165 Flicker sensitivity of the human red and green color mechanisms O Estévez and C R Cavonius (Laboratorium voor Medische Fysica, Amsterdam, Netherlands) *Vision Research*, vol 15, July 1975, p 879-881 5 refs

A75-33175 Effect of alcohol and task on hemispheric asymmetry of visually evoked potentials in man L E Rhodes, F W Orbitz, and D Creel (U S Veterans Administration Hospital, Phoenix, Arizona State University, Tempe, Ariz) *Electroencephalography and Clinical Neurophysiology*, vol 38, June 1975, p 561-568 23 refs USVA Project 1607-01

A75-33194 # Comparison of the mechanical and biochemical characteristics of the arterial vessels in the human brain (Sopostavlenie mekhanicheskikh i biokhicheskikh kharakteristik arterial'nykh sosudov golovnoga mozga cheloveka) M A Godlevska (Rizhskii Meditsinskii Institut, Riga, Latvian SSR), L I Slutskii (Rizhskii Nauchno-Issledovatel'skii Institut Travmatologii i Ortopedii, Riga, Latvian SSR), and B A Purina (Akademiia Nauk Latviskoi SSR, Institut Mekhaniki Polimerov, Riga, Latvian SSR) *Mekhanika Polimerov*, Nov-Dec. 1974, p 1096-1106 27 refs In Russian

A75-33256 * Metabolic-adaptation of the chick embryo to chronic hypoxia J Beattie (Queens College, Cambridge, England) and A H Smith (California, University, Davis, Calif) *American Journal of Physiology*, vol 228, May 1975, p 1346-1350 22 refs Grants No PHS-HE-01920, No NGR-05-004-008

A75-33257 Salicylate, tryptophan, and tyrosine hypothermia R P Francesconi and M Mager (U S Army, Research Institute of Environmental Medicine, Natick, Mass.) *American Journal of Physiology*, vol 228, May 1975, p 1431-1435 33 refs

Experiments were conducted which found that intraperitoneal administration of sodium salicylate, L-tryptophan, and tyrosine resulted in significant hypothermia when rats were exposed to a 4 C ambient temperature This may have been due to increased free plasma tryptophan and tyrosine available for monoamine synthesis, leading to increased hypothalamic serotonin and norepinephrine levels However, alternative mechanisms of hypothermia are more likely, since oxygen consumption studies demonstrate dissimilar findings for tryptophan and salicylate administration S J M

A75-33258 Adenosine metabolism in cultured chick-embryo heart cells S J Mustafa, R M Berne, and R Rubio (Virginia, University, Charlottesville, Va) *American Journal of Physiology*, vol 228, May 1975, p 1474-1478 25 refs Grants No PHS-HL-10384, No PHS-HL-05815

Cultured cardiac cells of 16-day-old chick embryos were used as a model for the mammalian heart Hypoxia produced a twofold increase in the production of adenosine and its metabolic products in this preparation, indicating that the source of adenosine in the hypoxic heart is the myocardial cell Neither dipyrindamole nor aminophylline blocked the release of adenosine from the myocardial cells, but dipyrindamole inhibited the uptake of adenosine in the cardiac cells whereas aminophylline was without effect These data suggest that dipyrindamole exerts its vasodilator effect by blocking the uptake of adenosine into the cells, thereby increasing its extracellular levels and the concentration of adenosine in the vicinity of coronary resistance vessels The mechanism whereby aminophylline attenuates the vasodilation produced by adenosine is not known However, aminophylline does not interfere with the release or uptake of adenosine (Author)

A75-33259 * Shivering and nonshivering thermogenic responses of cold-exposed rats to hypothalamic warming C A Fuller, B A Horwitz, and J M Horowitz (California, University, Davis, Calif) *American Journal of Physiology*, vol 228, May 1975, p 1519-1524 28 refs Grant No NGR-05-004-099

A75-33260 Effects of acid-base changes, hypoxia, and catecholamines on ventricular performance E A Beierholm, R N Grantham, D D O'Keefe, M B Laver, and W M Daggett (Massachusetts General Hospital, Harvard University, Boston, Mass) *American Journal of Physiology*, vol 228, May 1975, p 1555-1561 30 refs Grants No PHS-HL-12777, No PHS-HL-12322, No PHS-HL-066641

A75-33261 Effect of temperature on rate of CO₂ uptake by human red cell suspensions R A B Holland and R E Forster, II (Pennsylvania, University, Philadelphia, Pa.) *American Journal of Physiology*, vol 228, May 1975, p 1589-1596 36 refs Grant No NIH-HL-4108

A75-33353 Time optimal behavior of human saccadic eye movement M R Clark (Stanford Research Institute, Menlo Park, Calif) and L Stark (California, University, Berkeley, Calif) *IEEE Transactions on Automatic Control*, vol AC-20, June 1975, p 345-348 39 refs Grant No PHS-R01-NS-08546

A detailed homeomorphic physiological model of the versional eye tracking system responsible for the extremely rapid and precise movements called saccades was constructed based on quantitative muscle, neuronal and oculomotor characteristics in order to test for time optimality. It is a sixth-order nonlinear representation that considers reciprocal innervation and the asymmetrical force-velocity relationship of the agonist-antagonist muscle pair that moves the eye. Model response was compared with measured human saccadic eye movements, and it was found that this experimental data agreed most completely with the model driven by first-order time-optimal control signals. Moreover, electromyographic studies in man, and neurophysiological experiments in animals agree in showing that the nervous controller signals during saccades are also of the first-order type S J M

A75-33366 # Acute altitude exposure test for the members of the expedition to Mt Sickle Moon /6,574 m/ R Yurugi, M Kagami, H Higuchi, T Akiyama, E. Sakaguchi, Y Kakimoto, C Mizumoto, N Yuza, N Nitami, and T Yanaka (Japan Air Self Defence Force, Aeromedical Laboratory, Tokyo, Japan) *Japan Air Self Defence Force, Aeromedical Laboratory, Reports*, vol 15, Sept. 1974, p 70-84 22 refs In Japanese, with abstract in English

Results of acute altitude exposure tests (simulated 4000 and 6000 m) before and after 40-day residence at 3600 m are presented. Findings show significant acclimatization to altitude after the sojourn. Body weight, heart rate, respiratory quotient and blood lactate decreased during acute altitude exposure at post-expedition compared to pre-expedition, while minute ventilation, maximum breathing capacity, forced expiratory volume, red cell count and hematocrit value increased during sea-level testing after expedition relative to before expedition S J M

A75-33367 # Physiological investigation for the members of the expedition to Mt Sickle Moon during mountaineering activities. R Yurugi and Y Kakimoto (Japan Air Self Defence Force, Aeromedical Laboratory, Tokyo, Japan) *Japan Air Self Defence Force, Aeromedical Laboratory, Reports*, vol 15, Sept 1974, p 85-94 10 refs In Japanese, with abstract in English

Physiological function was investigated during mountaineering activities at high altitude. Mild symptoms of acute mountain sickness (headache, nausea, loss of appetite, sleeplessness, diarrhea, thirst, etc) were observed after arrival at base camp (3605 m), but they disappeared in a few days. Heart rate increased sharply upon ascent but decreased gradually during sojourn. Length of voluntary apnea was lower at altitude than at sea level. Attention span was higher during mountaineering than before or after the expedition, probably due to brain hyperactivity connected with cardiopulmonary hyperfunction in response to hypoxia S J M

A75-33368 # Psychological investigation for members of Mt Sickle Moon /parts of the Himalayas/ climbing party - An analysis of changes on the profile of Yatabe Guilford personality inventory during climbing period Y Kakimoto and R Yurugi (Japan Air Self Defence Force, Aeromedical Laboratory, Tokyo, Japan) *Japan Air Self Defence Force, Aeromedical Laboratory, Reports*, vol 15, Sept 1974, p 95-107 18 refs In Japanese, with abstract in English

Yatabe-Guilford personality inventories and California personality inventories were carried out on members of a high-altitude climbing party. Six of the seven members could be classified into D type (emotionally stable and positive), while the seventh was C type

(emotionally stable and passive). Anxiety-related Y-G traits such as depression, cyclic tendency, inferiority, nervousness, lack of objectivity, and lack of cooperation tended to decrease with time at altitude, being lowest after the climb, while general activity and social extroversion increased during the sojourn. Thus, effective adaptation to the group atmosphere and physical condition apparently occurred S J M

A75-33369 # Effects of sustained exposure to simulated altitude on tissue Na spaces of the organs in rats and rabbits. E Sakaguchi and T Akiyama (Japan Air Self Defence Force, Aeromedical Laboratory, Tokyo, Japan) *Japan Air Self Defence Force, Aeromedical Laboratory, Reports*, vol 15, Sept 1974, p 108-119 31 refs. In Japanese, with abstract in English

A75-33370 # Development of a complex performance tester /CPT/ H Hagihara, Y Nagasawa, K Niwa, S Aramaki, M Okaue, and Z Kato (Japan Air Self Defence Force, Aeromedical Laboratory, Tokyo, Japan) *Japan Air Self Defence Force, Aeromedical Laboratory, Reports*, vol 15, Sept 1974, p 120-125 23 refs In Japanese, with abstract in English

A human performance tester for evaluating several parameters has been developed. It consists of four testing units: (1) tracking, (2) meter detection, (3) decoding of audio signals, and (4) arithmetic problem solving. Each test unit can be used individually or in combination with other units, and results of the tests are available immediately. Performance in fast and team work situations has been studied with the tester S J M

A75-33371 # Effect of fasting on tolerance to moderate hypoxia C Sakakibara, N Yuza, and N Nitami (Japan Air Self Defence Force, Aeromedical Laboratory, Tokyo, Japan) *Japan Air Self Defence Force, Aeromedical Laboratory, Reports*, vol 14, Dec 1973, p 107-114 14 refs In Japanese, with abstract in English

Blood pressure, heart rate, pulmonary ventilation, oxygen intake, respiratory quotient, blood glucose, and lactate concentration were measured in four healthy male subjects while fasting and under controlled conditions (not fasting) in normal air and in 11.65% oxygen for one hour. (1) There was a tendency for heart rate to increase in a fasting hypoxic state, (2) blood pressure, pulmonary ventilation and oxygen intake did not show any significant change in fasting hypoxia relative to control, (3) respiratory quotient decreased during fasting hypoxia compared to control, (4) blood glucose did not increase in a fasting hypoxic state, and (5) blood lactate concentration showed a slight decrement in both normoxic and hypoxic fasting states S J M

A75-33372 # The analysis of aviation training evaluations II - Similarities of aviation performances in flying training courses M Okaue, M Nakamura, and H Horii (Japan Air Self Defence Force, Aeromedical Laboratory, Tokyo, Japan) *Japan Air Self Defence Force, Aeromedical Laboratory, Reports*, vol 14, Dec 1973, p 122-131 5 refs In Japanese, with abstract in English

Correlation coefficients of aviation performance evaluations between flight training courses were compared in order to find similarities among different courses. Courses compared comprised PH 1, PH-2, BASIC, and FC, and APT. It was found that (1) the aviation performance evaluations in PH-2 mostly coincided with those of BASIC, (2) flying feel was most related to native ability, (3) procedural sequences were considered to be different in each course by the pilots, but longer hours in PH-1 (the primary course) were correlated with the feeling that BASIC and PH-2 were the same, and (4) depending on the type of aviation performance, the degree of similarity between courses varied S J M

A75-33373 # Studies on the toxic properties of free fatty acids I - The hemolytic effect and fifty percent lethal doses of several fatty acids M Kagami and N Nitami (Japan Air Self Defence Force, Aeromedical Laboratory, Tokyo, Japan) *Japan Air Self Defence Force, Aeromedical Laboratory, Reports*, vol 14, Dec. 1973, p. 140-146 22 refs. In Japanese, with abstract in English

The toxicity of free fatty acids was studied in unanesthetized male mice of the dd-strain. Long-chain, saturated fatty acids almost invariably caused the death of the mice within one minute, long-chain, unsaturated fatty acids and short-chain, saturated fatty acids were essentially nonlethal. In vivo hemolysis occurred, although it was least associated with long-chain, saturated fatty acids. Thus hemolysis was not a major factor in the death of the animals. The mice probably died due to the chemical action of long-chain, saturated fatty acids or as a result of mechanical obstruction of the arterioles and the brain by the insoluble particles. Saturated, short-chain acids and unsaturated, long-chain acids were probably very rapidly bound by plasma albumin and other blood substances, and thus rendered nontoxic. S J M.

A75-33374 # Relationship between whole body tolerance to moderate cold and local tolerance to extreme cold N Yuza (Japan Air Self Defence Force, Aeromedical Laboratory, Tokyo, Japan) *Japan Air Self Defence Force, Aeromedical Laboratory, Reports*, vol 14, Dec 1973, p 147-160 13 refs. In Japanese, with abstract in English

Experiments were performed to determine local and general tolerance to extreme and moderate cold, respectively. During the local (index finger) test, mean skin temperature plunged to nearly ambient (4 C) level, then oscillated about a value some 9 C above ambient level. In the tests on the entire body, metabolic rate, hematocrit value, and blood pressure increased with time in the climatic chamber, while mean skin temperature and heart rate decreased with time. Metabolic rate increase was proportional to mean skin temperature decrease per unit time, and the ratio of the former to the latter quantity was used as an index of general cold tolerance. S J M.

A75-33375 # Influence of sustained exposure to hypobaric hypoxia on the plasma prothrombin time, fibrinogen level and fibrinolytic activity in rabbits - A preliminary report M Kagami, T Akiyama, T Yanaka, and R Yurugi (Japan Air Self Defence Force, Aeromedical Laboratory, Tokyo, Japan) *Japan Air Self Defence Force, Aeromedical Laboratory, Reports*, vol 15, Sept 1974, p 161-164 12 refs. In Japanese, with abstract in English

A75-33418 Vibrations of the basilar membrane L A Ostrovskii and A M Sutin (Nauchno-Issledovatel'skii Radiofizicheskii Institut, Gorki, USSR) (*Akusticheskii Zhurnal*, vol 20, Nov-Dec 1974, p 874-880) *Soviet Physics - Acoustics*, vol 20, May-June 1975, p 534-537 14 refs. Translation

A75-33472 Visual motion perception G Johansson (Uppsala, University, Uppsala, Sweden) *Scientific American*, vol 232, June 1975, p 76-80, 85-88

Experiments in visual motion perception are qualitatively analyzed that prove the projective, rather than Euclidean, geometric nature of percepts. The eye tends to assume spatial invariance, or invariance of form, in conjunction with motion rather than variance of form without motion. This preference in optical flow interpretation (which occurs even before the stimuli reach the level of consciousness) gives rise to a hierarchical series of moving frames of

reference and of motions relative to each of them. The more complex a projectively coherent pattern is from the mathematical point of view, the more effective the sensory decoding is. Thus in the real world, our central perspective interpretation of visual signals corresponds closely to what they 'actually' represent. S J M.

A75-33549 Factors controlling impulse transmission with special reference to A-V conduction Y Watanabe (Fujita Gakuen University, Toyoake, Japan) and L S Dreifus (Lankenau Hospital, Philadelphia, Pa) *American Heart Journal*, vol 89, June 1975, p 790-803 95 refs

Various factors controlling the propagation of cardiac impulses in general are reviewed, and some of the peculiarities of atrioventricular (A-V) conduction are discussed. The objective of the present work is to illustrate the complexity and diversity of the phenomenon of conduction in the heart. Arguments are presented for a new classification of A-V conduction block. S J M.

A75-33563 Generation of forcing functions for evaluating performance at the man-machine interface A M Sherwood and D Sengupta (Texas A & M University, College Station, Tex) *Simulation*, vol 24, Apr 1975, p 109-112

The evaluation of the performance of individuals or devices at the man-machine interface can, in most instances, be accomplished through the simulation of typical dynamic tasks. This paper describes a simple, flexible technique for the generation of waveforms for use as forcing functions in such situations. The technique uses an analog computer under the control of external digital logic. A one-dimensional tracking problem illustrates the use of the technique. Diagrams and all relevant parameters for this problem are given. The simulation system creates a straight-line-segment graph to control the target. The system includes an automated scoring feature with digital printout. (Author)

A75-33607 Myocardial infarction in young men - Study of risk factors in nine countries M A Dolder and M F Oliver (Royal Infirmary, Edinburgh, Scotland) *British Heart Journal*, vol 37, May 1975, p 493-503 30 refs. Research supported by the I S C Scientific Council for Atherosclerosis and Ischaemic Heart Disease and Swiss National Funds

Two hundred forty male survivors of myocardial infarction were studied in order to determine whether the development of infarction is associated with different risk factors. In developed countries, there was a high prevalence of risk factors, particularly of hyperlipidemia and cigarette smoking. The predominance of hypertension, obesity, hyperglycemia, and hyperuricemia varied with the country sampled. The present study should help guide urban centers in future etiological research and prophylactic measures. S J M.

A75-33608 Measurement of diastolic closure rate of normal mitral valve J C Rodger (Stobhill General Hospital, Glasgow, Scotland) and D J Sumner (West of Scotland Health Boards, Glasgow, Scotland) *British Heart Journal*, vol 37, May 1975, p 504-513 18 refs

By measuring only complexes with essentially monophasic closure movements, the within and between-subject variation of the normal mitral diastolic closure rate was investigated. The ranges obtained from multiple measurements in a single subject and from a group of 45 normal subjects were comparable, but the distribution of the results differed. It was concluded that there was real between-subject variation in the normal mitral diastolic closure rate and that the diastolic closure rate in a single subject should be determined by measurement of a series of complexes. The accuracy of measurement of the diastolic closure rate of the normal mitral valve has been improved by using strip chart records and by measuring only echograms in which diastolic closure approximates closely to a monophasic form. S J M.

A75-33616 The test pilot and the quality control system
P P Trevisan (Aeritalia S.p.A., Rome, Italy) *Society of Experimental Test Pilots, Technical Review*, vol 12, no 3, 1975, p 27-32

The quality control system is intended to provide assurance, and to verify, that the machine was built to certain standards and requirements. The job of the test pilot is to find out whether (and how) the flying machine performs in the way it was designed for, and if not, to contribute to its improvement and perfection. The pilots position within the frame of the quality control system is described, and his duties and responsibilities in regard to this activity are outlined.
V P

A75-33647 # Acid-base changes and excitation - Contraction coupling in rabbit myocardium. I - Effects on isometric tension development at different contraction frequencies II - Effects on resting membrane potential, action potential characteristics and propagation velocity. M Johansson and E Nilsson (Lund, University, Lund, Sweden) *Acta Physiologica Scandinavica*, vol 93, Mar 1975, p 295-317 43 refs Research supported by Lund University and Swedish Medical Research Council. SMRC Project 04X-184

A75-33648 # The relationship between arterial P-O₂ and cerebral blood flow in hypoxic hypoxia L Borgstrom, H Johansson, and B K Siesjo (University Hospital, Lund, Sweden) *Acta Physiologica Scandinavica*, vol 93, Mar 1975, p 423-432 20 refs Research supported by the Swedish Bank Tercentenary Fund and Swedish Medical Research Council, Grant No. NIH-5-RO1-NS-07838-06 SMRC Project 14X-263, SMRC Project 14X-2179

The relationship between arterial oxygen tension (Pa-O₂) and cerebral blood flow (CBF) in hypoxic hypoxia was studied in artificially ventilated and normocapnic rats. Changes in CBF were evaluated from arteriovenous differences in oxygen content after 2, 5, 15 and 30 min exposure to Pa-O₂ of 85, 75, 55, 45, 35 and 25 mm Hg. In separate experiments, the Pa-O₂ was decreased to 25 mm Hg for 1, 2, 4, 15 and 30 min in animals in which Pa-CO₂ was allowed to fall by 5-10 mm Hg. The results give no support to the hypothesis that cerebral hyperemia in hypoxia is coupled to accumulation of lactic acid in the tissue.
(Author)

A75-33672 Plasma renin activity during and after dynamic and static exercise J G Collier, J Keddie, and B F Robinson (St George's Hospital, London, England) *Cardiovascular Research*, vol 9, May 1975, p 323-326 11 refs Research supported by the St George's Hospital

The effect of dynamic and static exercise on plasma renin activity was investigated in three normal males. Near maximal supine exercise for 10 min on a bicycle ergometer caused a small increase in plasma renin activity during exertion with a much larger increase during recovery which reached a peak between 10-20 min. Supine exercise at half this level and static exercise (hand-grip) had no detectable effect on plasma renin activity.
(Author)

A75-33673 Calcium-induced damage of rat heart mitochondria. D R Parr, J M Wilmhurst, and E J Harris (University College, London, England) *Cardiovascular Research*, vol 9, May 1975, p 366-372. 24 refs Research supported by the British Heart Foundation and Medical Research Council

The damage which may be caused to heart mitochondria by the rapid uptake of calcium when oxygen is restored after a period of anoxia is monitored by the deterioration in phosphorylation performance. Methods of protecting mitochondria from this damage by preventing calcium uptake and by chelating cytoplasmic calcium are considered.
(Author)

A75-33674 The feasibility of detecting His-bundle activity from the body surface A Furness, G P Sharratt, and P Carson (City General Hospital, Stoke on Trent, Staffs, England) *Cardiovascular Research*, vol 9, May 1975, p 390-396 14 refs

Electrocardiograms were recorded from human patients using a bipolar chest lead together with simultaneous His-bundle electrograms. These were then subjected to the technique of signal averaging in an attempt to extract His-bundle activity from the surface record. This was successful in three out of 10 cases subjected to the truly non-invasive surface technique. Methods are discussed by which the technique could be improved.
(Author)

A75-33675 * Effect of varying differentiator frequency response on recorded peak dP/dt W H Barry, A M Marlon, M Adams, and D C Harrison (Stanford University, Stanford, Calif.) *Cardiovascular Research*, vol 9, May 1975, p 433-439 16 refs Grants No. NIH-HE-09058, No. NIH-HL-5866, No. NIH-HL-5709, No. NGL-05-020-305

Dogs were used to study the effects of varying the differentiator cutoff frequency on the recorded peak first derivative of left ventricular pressure with respect to time (dP/dt), using high-precision solid-state pressure transducers and recording equipment. In canine hearts with a basic periodicity of 1 to 3 Hz, the differentiator frequency response required to record an accurate peak dP/dt is found to be influenced by the value of peak dP/dt. At peak dP/dt ranging from 1500 to 9000 mm Hg/sec (200 and 1200 kPa/sec), a differentiator cutoff frequency of at least 90 Hz was required to record accurately peak dP/dt.
V.P

A75-33746 # Safety regulations concerning a use of lasers (Sicherheitsbestimmungen beim Einsatz von Lasern) P Sturk (Hauptverband der gewerblichen Berufsgenossenschaft, Bonn, West Germany) In Status of laser applications technology in the field of air-purity preservation, Laser Meeting, Essen, West Germany, October 9-11, 1974, Lectures Essen, Landesanstalt für Immissions- und Bodennutzungsschutz, 1974, p 297-303 In German

The accident prevention regulations regarding laser radiation in West Germany have been in force since Apr 1, 1973. The regulations are applicable in all cases involving the generation and the use of laser beams. Excepted are only devices with output energy levels which are too low for the generation of hazardous radiation with injury-producing capabilities. Details concerning the safety regulations are discussed, giving attention to the concept of laser range, design radiation-protection features, and the appointment of an expert who is responsible for the safety aspects of laser operation.
G R

A75-33747 # Laser-produced hazards to the eye, taking into account turbulence (Augengefährdung durch Laser unter Berücksichtigung der Turbulenz) W Buchtemann (Forschungsinstitut für Optik, Tübingen, West Germany) In Status of laser applications technology in the field of air-purity preservation, Laser Meeting, Essen, West Germany, October 9-11, 1974, Lectures Essen, Landesanstalt für Immissions- und Bodennutzungsschutz, 1974, p 304-314 18 refs In German

The German safety regulations concerning the permissible irradiation intensity are briefly examined. Hazardous conditions connected with laser operation are related to observations of the direct beam, the reflected beam, and the scattered beam. Effects of turbulence are investigated and approaches for the determination of the turbulence-related maximum irradiation are discussed. Attention is given to various factors which affect the variations in irradiation intensity.
G R

A75-34077 * The occurrence of dark neurons in the normal and deafferented lateral vestibular nucleus in the rat - Observations by light and electron microscopy J E Johnson, Jr (NASA, Ames Research Center, Neurosciences Branch, Moffett Field, Calif) *Acta Neuropathologica*, vol 31, 1975, p 117-127 19 refs NASA Task 970-21-11-11

A75-34109 # The voluntary control in human breathing P K Halttunen (Helsinki, University, University Central Hospital, Helsinki, Finland) *Acta Physiologica Scandinavica, Supplementum* no 419, 1974, p 1-5, 7-37 (8 ff) 30 refs

An investigation of voluntary breathing in which the following problems were studied (1) the relationship between the subjective sensation and the volumes produced by the respiratory muscles when they are controlled voluntarily, (2) the relationship between the subjective sensation and the electrical activity produced by the intercostal muscles during voluntary inspiration, and (3) the effect of an increased carbon dioxide stimulation on the relationship between subjective sensation and respiratory volumes. It was experimentally determined that (1) the subjective sensation follows the power law with the method of magnitude estimation, (2) the sensation has a higher correlation to total number of EMG impulses than to EMG frequency, and (3) during CO₂ stimulation, a greater respiratory volume equals the same sensation magnitude S J M

A75-34275 Auditory system Part 1 - Anatomy Physiology /Ear/ Edited by W D Keidel (Erlangen-Nurnberg, Universitat, Erlangen, West Germany) and W D Neff (Indiana University, Bloomington, Ind) Berlin, Springer-Verlag (Handbook of Sensory Physiology Volume 5/1), 1974 742 p \$117 50

New and updated information on the anatomical, physio-acoustical, and physiological aspects of hearing is presented. Topics discussed in the handbook include the morphology of the middle ear muscles in mammals, efferent innervation of the cochlea, central auditory pathways of nonmammalian vertebrates, the evolution of vertebrate hearing, neural excitatory processes of the inner ear, and physicochemical properties of the inner ear especially ionic transport S J M

A75-34376 * Choice reaction time to visual motion during prolonged rotary motion in airline pilots J D Stewart (NASA, Ames Research Center, Moffett Field, Calif) and B Clark (San Jose State University, San Jose, Calif) *Aviation, Space, and Environmental Medicine*, vol 46, June 1975, p 767-771 22 refs Grant No NGL-05 046 002

Thirteen airline pilots were studied to determine the effect of preceding rotary accelerations on the choice reaction time to the horizontal acceleration of a vertical line on a cathode-ray tube. On each trial, one of three levels of rotary and visual acceleration was presented with the rotary stimulus preceding the visual by one of seven periods. The two accelerations were always equal and were presented in the same or opposite directions. The reaction time was found to increase with increases in the time the rotary acceleration preceded the visual acceleration, and to decrease with increased levels of visual and rotary acceleration. The reaction time was found to be shorter when the accelerations were in the same direction than when they were in opposite directions. These results suggest that these findings are a special case of a general effect that the authors have termed 'gyrovisual modulation' (Author)

A75-34377 Oxygen-induced inhibition of mouse brain lactate dehydrogenase D A Baeyens (US Army, Aeromedical Research Laboratory, Fort Rucker, Ala) *Aviation, Space, and Environmental Medicine*, vol 46, June 1975, p 772-774 13 refs

The lactate dehydrogenase (LDH) activity of mouse brain homogenates was examined after exposure to hyperbaric oxygen (5763.8 mm Hg P-O₂) and compared to room air controls (158.8

mm Hg P-O₂). The effect of reduced glutathione on LDH activity after hyperbaric oxygen exposure was also examined. The activity of LDH after treatment with hyperbaric oxygen was significantly diminished when compared with controls. In the presence of reduced glutathione, homogenates exposed to hyperbaric oxygen demonstrated higher activity than did homogenates incubated without glutathione. It is concluded that oxygen-induced inhibition occurs through the oxidation of essential free sulfhydryl groups and that this oxidation can either be prevented by reduced glutathione or the disulfide bridges may be reduced to free sulfhydryl groups by the glutathione after oxidation (Author)

A75-34378 Cardiovascular changes during and following 1-min exposure to +Gz stress D F Peterson, V S Bishop, and H H Erickson (Texas, University, San Antonio, USAF, School of Aerospace Medicine, Brooks AFB, Tex) *Aviation, Space, and Environmental Medicine*, vol 46, June 1975, p 775-779 19 refs Grant No AF AFOSR 71 2074

Magnitude and duration of cardiovascular responses following +Gz forces of 1.5 G were studied in chronically instrumented anesthetized dogs. During lower G forces (+1 to +3Gz), responses were variable. In most dogs during higher G forces (+4 or +5Gz), aortic pressure, cardiac output, left ventricular pressure, and dp/dt were all dramatically compromised. These changes were observed whether the onset of the gravitational inertial force was slow (0.1 G/s) or rapid (1.0 G/s). Cardiovascular changes after acceleration were consistent. Left atrial pressure and arterial pressure rose and a transient rise in dp/dt was often observed. Cardiac output rose briefly, then fell; hence, peripheral resistance increased. Magnitude and duration of these changes were directly related to G forces during acceleration. Our results confirm that +Gz stress produces major cardiovascular changes. Our experiments also demonstrate that responses following +Gz stress may be dramatic and prolonged. Increased peripheral resistance elevates perfusion pressure and, concurrently, the increased preload may cause acute cardio-pulmonary congestion (Author)

A75-34379 * Effects of a 2X gravity environment on the ultrastructure of the gerbil parathyroid gland P L Sannes and T G Hayes (Ohio State University, Columbus, Ohio) *Aviation, Space, and Environmental Medicine*, vol 46, June 1975, p 780-784 23 refs Contract No NAS2-6634

A number of studies concerning the effects of hypergravity on bone have shown increases in bone mass or bone dimensions. Correlative studies, which could provide clues to the mechanism for such a response, have been lacking. The purpose of the present study was to evaluate the ultrastructure of parathyroid glands of Mongolian gerbils exposed to a continuous 2 X gravity force for 60 d. It was found that the experimental animals had parathyroid glands which had a greater percentage of chief cells in the active stage of their secretory cycle when compared with control animals. This result was interpreted to indicate an increase in parathyroid gland secretory activity and, hence, an increase in parathyroid hormone release. It was suggested that increased parathyroid secretory activity was necessary to maintain serum calcium levels of hypergravity animals within normal limits. Cellular forms resembling water clear cells and highly compact, degenerating cells were described in experimental animals but not in controls. Areas suggestive of cellular dissolution and disorganization were also reported in experimental parathyroids (Author)

A75-34380 Subjective response to very low-frequency vibration R W Shoenberger (USAF, Aerospace Medical Research Laboratory, Wright Patterson AFB, Ohio) *Aviation, Space, and Environmental Medicine*, vol 46, June 1975, p 785-790 11 refs (AMRL TR 74-142)

Using intensity matching and magnitude estimation techniques, seated subjects made judgments of the perceived intensity of vertical, short-duration (30-60s), high amplitude, low-frequency (0.25-4.0 Hz) vibration. Intensity matching (setting comparison frequencies to

match the perceived intensity of a standard frequency) produced equal intensity contours that indicated minimum sensitivity in the vicinity of 1 Hz. Frequencies both above and below 1 Hz were judged subjectively equal at progressively lower accelerations. In the magnitude estimation procedure, subjects assigned values of subjective magnitude to various levels of a given frequency in proportion to the subjective magnitude of a standard level at the same frequency. For each of seven frequencies sampled, the data produced straight line functions on log-log plots of subjective magnitude vs acceleration. Data from both the intensity matching and magnitude estimation experiments were combined to provide a model that allowed the extension of various vibration exposure criteria down to 0.25 Hz, using data at 4 Hz as a basis for extrapolation - even at intensity levels beyond the capabilities of available vibration devices. (Author)

A75-34381 **Effects of 60 and 80% oxygen on cell division in lung alveoli of squirrel monkeys** J D Hackney, M J Evans, and B R Christie (Rancho Los Amigos Hospital, Downey, Stanford Research Institute, Menlo Park, Calif.) *Aviation, Space, and Environmental Medicine*, vol 46, June 1975, p 791-794. 12 refs. Contract No. N00014-70-C-0306, Grants No. NIH-HL-15098, No. NIH-71-2151.

The purpose of this study was to determine the effects on cell division of 60 and 80% oxygen in the lung alveoli of squirrel monkeys. To accomplish this, squirrel monkeys were exposed to 60 and 80% oxygen for up to 8 d. Prior to sacrifice, cells preparing to divide were labeled with tritiated thymidine (H-3-TdR). Labeled cells were visualized with autoradiographic techniques, counted with the light microscope, and expressed in terms of a labeling index. In the present study, it was shown that DNA synthesis was not changed by exposure to 60%, however, with exposure to 80% oxygen, cell labeling was well above control levels by 5 d. Analysis of the cell types involved showed an increase in labeling due to an increase in dividing Type 2 cells. Other cells in the alveolar wall also showed an increase in labeling. (Author)

A75-34382 **Water and electrolyte replacement during repeated days of work in the heat** D L Costill, R Cote, E Miller, T Miller, and S Wynder (Ball State University, Muncie, Ind.) *Aviation, Space, and Environmental Medicine*, vol 46, June 1975, p 795-800. 16 refs. Research supported by the Ball State University and Johnson and Johnson, Grant No. NIH-AM-17083-02.

A75-34383 * **Comparison of 70 deg tilt, LBNP, and passive standing as measures of orthostatic tolerance** K H Hyatt, L B Jacobson, and V S Schneider (U.S. Public Health Service Hospital, San Francisco, Calif.) *Aviation, Space, and Environmental Medicine*, vol 46, June 1975, p 801-808. 12 refs. NASA Order T-40-B.

The present study was performed to assess the reliability of lower body negative pressure (LBNP) as a test of orthostatic tolerance. The need for this assessment arose from the prior observation in this laboratory that some subjects show wide day-to-day variation in heart rate responses to LBNP. The extent of these variations was so great as to raise a serious question as to the value of LBNP as a measure of study-induced alterations (e.g., those produced by bedrest or weightlessness) in orthostatic tolerance. Five healthy volunteers were subjected to a series of tests, consisting of 70 deg tilt, LBNP, and passive standing, on three occasions preceding and three occasions following a 2-week period of bedrest. Study results show that it is possible to subdivide the volunteers into subgroups which show either great or little day-to-day variability in any of the three tests. All three tests revealed bedrest-induced alterations in orthostatic tolerance quite adequately. Of the three tests studied, LBNP most frequently resulted in the largest test-induced heart rate alterations, followed by quiet standing and, finally, 70 deg tilt. (Author)

A75-34384 * **Selection of artificial gravity by animals during suborbital rocket flights** K O Lange, R E Belleville (National Institute on Drug Abuse, Rockville, Md.), and F C Clark (Mississippi University, University, Miss.) *Aviation, Space, and Environmental Medicine*, vol 46, June 1975, p 809-813. 9 refs. Grants No. NGL-18-001-003, No. NGR-34-003-041.

White rats selected preferred artificial gravity levels by locomotion in centrifuges consisting of two runways mounted in the nose of sounding rockets. Roll rate of the Aerobee 150A rocket was designed to produce an angular velocity of 45 rpm during 5 min of free fall, providing a gravity range from 0.3 to 1.5 G depending on a subject's runway position. One animal was released at the high and one at the low gravity position in each flight. Animal positions were continuously recorded. Locomotion patterns during these flights were similar. All four animals explored the entire available G-range. One rat settled at 0.4 G after 2 min, the others crossed the 1 G location in progressively narrower excursions and were near earth gravity at the end of the test period. Tentatively, the data suggest that normal earth-reared rats select earth gravity when available magnitudes include values above and below 1 G. Modification of gravity preference by prolonged exposure to higher or lower levels remains a possibility. (Author)

A75-34385 **Motion effects on the human operator in a roll axis tracking task** A M Junker and C R Replogle (USAF, Aerospace Medical Research Laboratory, Wright-Patterson AFB, Ohio.) *Aviation, Space, and Environmental Medicine*, vol 46, June 1975, p 819-822.

To better understand the effects of motion on tracking performance, a simulator, capable of being controlled in a static as well as motion mode, was developed. Using this simulator, 12 volunteers, separated into groups of four, attempted to track a wing angle target display. The target was driven with band-limited (0.5 rad/s) Gaussian noise so that a roll angle of 120 deg was equivalent to 1 S.D. Different control dynamics (plants) were used for each group of volunteers. For manual control of squared plants of the form K/S, the experimental results indicate that large-amplitude roll motion information reduces task learning time and causes a significant improvement in tracking performance. For control of simpler plants, of the form K/S, no improvement due to the presence of the motion environment was observed. (Author)

A75-34386 **Anemia and airline flight duties** V Scott (United Air Lines, Inc., Chicago, Ill.) *Aviation, Space, and Environmental Medicine*, vol 46, June 1975, p 830-835. 21 refs.

This investigation developed and provides guidelines for the determination and medical release of flight crew members for duty with hemoglobin values less than normal. This dilemma occurs commonly to the flight surgeon following blood donation, resolved hemorrhagic disorders, chronic idiopathic blood disorders, and pregnancy. Minimum safe values were computed and tabulated for otherwise healthy individuals at rest and exercise at the routine extremes of the flight environment of present pressurized jet airliners from known physiological parameters. These values were then correlated with the records of 62 pilots and stewardesses with subnormal hemoglobin values to assure the operational predictive validity. (Author)

A75-34387 **Spinal injury after ejection in jet pilots - Mechanism, diagnosis, followup, and prevention.** G Rotondo (Italian Air Force, Military School of Aviation Medicine, Rome, Italy.) *Aviation, Space, and Environmental Medicine*, vol 46, June 1975, p 842-848. 33 refs.

In order to contribute to the study of spinal injury after ejection, the author analyzed the results of 100 cases of ejections carried out by military and civil Italian jet pilots in a period of 20 years. Of this group, 47 successfully ejected from aircraft without injury, 11 ejections proved fatal. The remaining 42 pilots sustained traumatic injuries after ejection and, of these, 15 sustained vertebral fractures, while 27 sustained other traumatic injuries different from spinal fractures. There were 23 vertebral fractures in 15 pilots and

the most frequently affected vertebrae were those of the thoracolumbar junction. Analysis was made of the pathology, the clinical and radiological profiles, the therapeutic treatment, and the relative aeromedical-legal aspects concerning the temporary unfitness for flying or permanent grounding of the personnel as well as the possible prevention of spinal injury after ejection (Author)

A75-34400 Voltage distribution across nerve membranes M Stenberg, I Lundstrom, and L Lundkvist (Chalmers Tekniska Hogskola, Goteborg, Sweden) *Nature*, vol 255, June 5, 1975, p 496, 497

A brief theoretical analysis is presented which demonstrates that nonlinearity of nerve membranes and model systems may be explained by the relationship of the voltage drop across the active parts of the membrane to the externally applied voltage. By assuming that the active areas in a membrane are surrounded by polar regions that are polarizable (that is, regions in which the dipole moments change with electric field), it can be concluded that the voltage drop over the portion of membrane inside the polar regions can be larger than the total membrane voltage S J M

A75-34540 * Human decision making in future ATC systems comparative studies in distributed traffic management J G Kreifeldt (Tufts University, Medford, Mass) and T E Wempe (NASA, Ames Research Center, Man-Machine Integration Branch, Moffett Field, Calif) In International Conference on Systems, Man, and Cybernetics, Dallas, Tex., October 2-4, 1974, Proceedings New York, Institute of Electrical and Electronics Engineers, Inc., 1974, p 180-185 6 refs

Seven different human-centered alternatives for distributing traffic management responsibility between air and ground in the terminal area were simulated and evaluated at NASA-Ames Research Center in the man-machine integration branch. The alternatives differed in three divisions of decision-making responsibility ranging from completely ground centered to completely air-centered and in the amount of information presented to the pilots via traffic situation displays (TSD). Objective, verbal and subjective measures of system performance, workloads, preferences, etc., were obtained. Based on the task and corresponding measures, the ground centered (vectoring) alternative was the least favorable. Best overall performance was achieved and preferred with a moderate division of responsibility in which controllers issued sequence order only and pilots used a TSD with 30 sec path predictors on their own aircraft. Speculations on the use of the results in context of a ground-centralized system failure and for future ATC systems are presented (Author)

A75-34543 A task analysis scheme with implications for supervisory control of remote manipulators D E McGovern (Stanford University, Stanford, Calif) In International Conference on Systems, Man, and Cybernetics, Dallas, Tex., October 2-4, 1974, Proceedings New York, Institute of Electrical and Electronics Engineers, Inc., 1974, p 462-466 8 refs AEC-supported research

A method of task analysis for remote manipulators based on studies of manual control performance is discussed. Results from one type of task are given for two different manipulator systems and the human hand. The implications of these results for supervisory control are indicated (Author)

A75-34801 * Effect of altered G levels on deposition of particulates in the human respiratory tract R A Hoffman and J Billingham (NASA, Ames Research Center, Biotechnology Div., Moffett Field, Calif) *Journal of Applied Physiology*, vol 38, June 1975, p 955-960 18 refs

A75-34802 Exercise responses following ozone exposure. L J Folinsbee, F Silverman, and R J Shephard (Toronto, University, Toronto, Canada) *Journal of Applied Physiology*, vol 38, June 1975, p 996-1001 33 refs Medical Research Council Grant No 4984

Physiological responses were monitored during exercise following or during ozone exposure. The major response noted was an increase in respiratory frequency, this increase was closely correlated with the total dose of ozone and was accompanied by a decrease in tidal volume, so that minute volume was unchanged. It is concluded that through its irritant properties, ozone modifies the normal ventilatory response to exercise, and that this effect is dose-dependent S J M

A75-34803 HbO₂ dissociation in man during prolonged work in chronic hypoxia J A Dempsey, J M Thomson, H V Forster, F C Cerny, and L W Chosy (Wisconsin, University, Madison, Wis) *Journal of Applied Physiology*, vol 38, June 1975, p 1022-1029 36 refs Research supported by the Wisconsin Heart Association, A H Robins Co., and University of Wisconsin

A75-34804 * Suppression of ADH during water immersion in normal man M Epstein, D S Pins, and M Miller (US Veterans Administration Hospital, Miami, University, Miami, Fla, US Veterans Administration Hospital, Upstate Medical Center, Syracuse, NY) *Journal of Applied Physiology*, vol 38, June 1975, p 1038-1044 42 refs Research supported by the Florida Heart Association and US Veterans Administration Research Funds, Grants No NIH-RR-261, No NGR-10-007 097, Contract No NAS9-11846

A study was undertaken to ascertain whether diuresis induced by immersion is mediated by an inhibition of ADH. Immersion resulted in a progressive decrease in ADH excretion from 80.1 ± 0.7 (SEM) to 37.3 ± 0.6 microU/min (P less than 0.025). Cessation of immersion was associated with a marked increase in ADH from 37.3 ± 0.6 microU/min to 176.6 ± 72.6 microU/min during the recovery hour (P less than 0.05). Concomitant with these changes, urine osmolality decreased significantly beginning as early as the initial hour of immersion from 1044 ± 36 to 542 ± 66 mosmol/kg H₂O during the final hour of immersion (P less than 0.001). These findings are consistent with the earlier suggestion that suppression of ADH release contributes to enhanced free water clearance in hydrated subjects undergoing immersion S J M

A75-34805 Influence of breathing pattern on oxygen exchange during hypoxia and exercise P G Hanson, K H Lin, and M B McIlroy (California, University, San Francisco, Calif) *Journal of Applied Physiology*, vol 38, June 1975, p 1062-1066 20 refs Grant No NIH-HL 06285

A75-34806 Incomplete compensation of CSF /H⁺/ in man during acclimatization to high altitude, 4,300 m H V Forster, J A Dempsey, and L W Chosy (Wisconsin, University, Madison, Wisconsin, Medical College, Milwaukee, Wis) *Journal of Applied Physiology*, vol 38, June 1975, p 1067-1072 24 refs Research supported by the American Lung Association and US Army, Grant No NIH-1-R01-HL-15469-01

Regulation of arterial blood and cerebrospinal fluid (CSF) pH was assessed in a group of subjects near sea level and at 4300 m altitude. Ventilatory acclimatization was accompanied by (1) reductions in HCO₃-concentration which were similar in arterial blood and CSF, (2) substantial but incomplete compensation of both CSF and blood pH, and (3) a level of CSF pH that was maintained significantly alkaline to normoxic control values. It is postulated that the magnitude and time course of acid-base compensation in the CSF during chronic hypoxia and/or hypocapnia are determined by corresponding changes in plasma HCO₃-concentration S J M

A75-34807 * Thermoregulatory control of finger blood flow C B Wenger, M F Roberts, E R Nadel, and J A J Stolwijk (John B Pierce Foundation Laboratory, Yale University, New Haven, Conn) *Journal of Applied Physiology*, vol 38, June 1975, p 1078-1082 34 refs Grants No NIH-ES-00123, No NIH-ES-00354, No NGR-07-008-002

In the present experiment, exercise was used to vary internal temperature and ambient air heat control was used to vary skin temperature. Finger temperature was fixed at about 35.7°C. Esophageal temperature was measured with a thermocouple at the level of the left atrium, and mean skin temperature was calculated from a weighted mean of thermocouple temperatures at different skin sites. Finger blood flow was measured by electrocapacitance plethysmography. An equation in these quantities is given which accounts for the data garnered. S J M

A75-34808 Normal values for hypoxic and hypercapnic ventilatory drives in man C A Hirshman, R E McCullough, and J V Weil (Colorado, University, Denver, Colo) *Journal of Applied Physiology*, vol 38, June 1975, p 1095-1098 22 refs

To better determine the range of normal values of hypoxic and hypercapnic ventilatory drives in man, these drives were measured in 40 males and 4 females between 21 and 51 yr of age. The average hypoxic drive, expressed as parameter A, was 186 ± 12.8 (SEM). The average hypercapnic drive, expressed as the slope S, was 2.69 ± 0.19 . The range of values for these individuals was large and could not be accounted for by variations in maximal oxygen uptake, age, or sex. However, positive correlations were found between these drives and height and weight, and a positive correlation was found between hypoxic and hypercapnic drive. (Author)

A75-34809 Effect of heart rate on left atrial systolic shortening in the dog H L Stone (Texas, University, Galveston, Tex) *Journal of Applied Physiology*, vol 38, June 1975, p 1110-1116 22 refs Grant No NIH-HL-14828

Experiments were conducted designed to change heart rate and end-diastolic diameter independently of each other while investigating the relationship between them. Results indicate that left atrial systolic shortening is primarily dependent on left atrial end-diastolic diameter or fiber length. Inotropic intervention can modify this relationship, heart rate has its major effect by changing the left atrial end-diastolic diameter. However, there is some apparent direct heart rate of frequency effect on left atrial systolic shortening. S J M

A75-34810 Muscular efficiency during steady-rate exercise - Effects of speed and work rate G A Gaesser and G A Brooks (California, University, Berkeley, Calif) *Journal of Applied Physiology*, vol 38, June 1975, p 1132-1139 30 refs Research supported by the University of California

The present study was undertaken in order to (1) further investigate similarities and differences between traditional and theoretical-thermodynamic approaches to calculating efficiency, (2) elucidate effects of speed and work rate on muscular efficiency, and (3) evaluate the adequacy of the various baseline corrections in describing relationships between caloric expenditure, work rate, and speed of motion. The traditional mode of computation investigated was judged to be superior, results of both types of calculation are presented. S J M

A75-34811 * Comparison of techniques for measuring +Gz tolerance in man R W Krutz, Jr, S A Rositano, and R E Mancini (NASA, Ames Research Center, Sunnyvale, Santa Clara, University, Santa Clara, Calif) *Journal of Applied Physiology*, vol 38, June 1975, p 1143-1145 13 refs

Two objective methods and one subjective method for measuring +Gz tolerance (inertial vector in a head-to-foot direction) were

compared on the human centrifuge. Direct eye level blood pressure (Pa), blood flow velocity in the superficial temporal artery (Qta), and subjective visual symptoms were used to determine tolerance to rapid-onset acceleration (1 G/s) on the USAFSAM human centrifuge. Seven 'relaxed' subjects with extensive centrifuge experience were exposed to gradually increasing +Gz plateaus until the subject reported 100% loss of peripheral centrifuge gondola lights (PLL) and 50% loss of central light (CLD), viz, blackout. Zero forward Qta occurred 6 s (range 4-9 s) before subjective blackout and when mean eye level blood pressure had reached 20 ± 1 mm Hg (SE). The results of this study indicate that flow changes in the superficial temporal artery reflect flow changes in the retinal circulation during +Gz stress. (Author)

A75-34867 Estimating the parameters of the human cardiovascular system J C Dennison and J H Christian (IBM Corp., Boulder, Colo) In *Inventing the model of the future*, Proceedings of the Southeast Region 3 Conference, Orlando, Fla., April 29-May 1, 1974. New York, Institute of Electrical and Electronics Engineers, Inc., 1974, p 182-184 5 refs

A scheme for estimating the parameters of the cardiovascular system with the aid of a computer is studied. The problem consists in estimating the parameters of a nonlinear model which must match a measured patient trajectory, which calls for the solution of a nonlinear, multi-point boundary value problem having time-varying coefficients. One aspect of the problem consists in finding a performance index having high sensitivity value with respect to the unknown parameters. P T H

A75-34925 Aerospace Medical Association, Annual Scientific Meeting, San Francisco, Calif., April 28-May 1, 1975, Preprints Washington, D C, Aerospace Medical Association, 1975 303 p Members, \$10.00, nonmembers, \$15

Various mostly experimental studies in different fields of aerospace medicine are presented. Topics investigated include vector cardiographic manifestation of hemodynamic effects, relationships to Skylab findings, variation in shape of the hemoglobin-oxygen affinity curve and its effect on oxygen delivery, inflight and intravenous therapy, a new dimension, the significance of bundle branch block in the apparently healthy aircrew member, mitochondrial energetics in ventricular myocardium of miniature swine subjected to +Gz acceleration, the sickle cell trait and aviation, physiological responses to different alterations of the wake-sleep cycle, noise control act, food selection and development, response time capabilities in the full visual field, and human response to buffeting in an all-terrain vehicle. S J M

A75-34954 Animal indicators of air pollution J R Newman (Western Washington State College, Bellingham, Wash) In *Institute of Environmental Sciences, Annual Technical Meeting 21st*, Anaheim, Calif., April 14-16, 1975, Proceedings Volume 2

Mount Prospect, Ill., Institute of Environmental Sciences, 1975, p 152-154 5 refs Research supported by the U S Environmental Protection Agency

The current work presents the highlights of an analysis of the feasibility and suitability of using animals as biological indicators of air pollution. Four types of response were found to give specific information on particular pollutants: physiological changes observed in autopsy or histology, residue accumulation, changes in blood chemistry and physiology, and changes in appearance or morphology. Other responses gave more general information as to their causes: cellular enzyme changes, abnormal behavior, and changes in abundance or distribution of animals. Certain pollutants are sufficiently understood for this kind of study, whereas others require more research. S J M

A75-34958 **The role of ear protection in reducing occupational hearing loss** R E Solomon (Occupational Health Service, Los Angeles, Calif) In Institute of Environmental Sciences, Annual Technical Meeting, 21st, Anaheim, Calif , April 14-16, 1975, Proceedings Volume 2 Mount Prospect, Ill , Institute of Environmental Sciences, 1975, p 178, 179

Investigations were conducted in four high-noise companies to determine whether there was a difference in effectiveness between ear muffs and ear plugs. It was found that muffs were generally more protective than plugs, simply because of reduced possibility for improper insertion in the former. There was a significant amount of hearing loss in all noise-exposed groups at 3000 and 4000 Hz, which did not appear in unexposed subjects, this finding calls into question the effectiveness of any type of ear protection S J M

A75-34966 **Variations in right and left coronary blood flow in man with and without occlusive coronary disease** S K Asokan, R C Fraser, R C Kolbeck, and M J Frank (Georgia, Medical College, Augusta, Ga) *British Heart Journal*, vol 37, June 1975, p 604-611 22 refs Research supported by the Georgia Heart Association

The present report establishes normal values for right and left coronary blood flow in patients with and without occlusive disease of the coronaries and attempts to correlate the degree of stenosis with the flow. The values are based on regional myocardial blood flow measurements in 34 patients. Selective coronary arteriograms were obtained using the Sones technique, and occlusions were graded as a percentage of luminal diameter S J M

A75-34967 **Non-invasive recording of His bundle potential in man - Simplified method** Y Hishimoto (Kyoto Prefectural University of Medicine, Kyoto, Japan) and T Sawayama (Kawasaki Medical College, Okayama, Japan) *British Heart Journal*, vol 37, June 1975, p 635-639

The present work reports electrocardiographic recordings of 'blips' considered to represent the His bundle potential, these His bundle potential recordings thus obtained by a procedure simpler and more noninvasive than previous ones. It was found that blips originating from the His bundle were recorded most distinctly when a cathode was applied to the posterior midline and an anode to the sternum, both at the level of the fourth intercostal space S J M

A75-35099 # **Psychodiagnosics in the service of development aid - The selection of Yemenite applicants for pilot training (Psychodiagnostik im Dienst der Entwicklungshilfe - Die Auswahl von jemenitischen Bewerbern für die Flugzeugführerausbildung)** K M Goeters (Deutsche Forschungs- und Versuchsanstalt für Luft und Raumfahrt, Institut für Flugmedizin, Hamburg, West Germany) *Zeitschrift für experimentelle und angewandte Psychologie*, vol 22, 2nd Quarter, 1975, p 195-217 11 refs In German

The suitability of pilot-training ability tests for applicants from a developing country was investigated. Differences in language and educational background make an employment of the normal procedure which is used for German applicants unsuitable. However, it has been found that a selection of suitable applicants is possible by taking into account these background-related difficulties. The test procedure used contains tests for studying eight cognitive capacities G R

A75-35100 # **Investigation concerning the time dependence of the parameters of signal detection theory and the effect of event frequency in the vigilance experiment (Untersuchung zur Zeitabhängigkeit der TSD Parameter und dem Einfluss der Ereignisfrequenz im Vigilanzexperiment)** B Zimolong (Braunschweig, Technische Universität, Braunschweig, West Germany) *Zeitschrift für experimentelle und angewandte Psychologie*, vol 22, 2nd Quarter, 1975, p 367-390 36 refs In German

An investigation was conducted regarding the variations in

detection performance produced by changes in signal and event frequencies. Attention was also given to the influence of signal probability. The data were analyzed with the aid of the approaches of signal detection theory. An observed decrease in vigilance is found to be related to a reduction in the value of the d' parameter G R

A75 35160 **A compensation for field expansion caused by moving forward** H Wallach and E W Flaherty (Swarthmore College, Swarthmore, Pa) *Perception and Psychophysics*, vol 17, May 1975, p 445-449 9 refs NSF Grant No 25000X

Experiments were conducted to determine what happens when a figure rapidly expands while both it and the subject viewing it remain in fixed positions. The operation of a compensating process was demonstrated by making use of the fact that prolonged exposure of a retinal area to the same motion process leads to a decrease in the perceived speed of the motion and to motion aftereffect. When prolonged exposure to an expanding motion occurred only during the subject's forward movements, subsequent perceived speed decrease was significantly diminished and motion aftereffects occurred substantially less often than under control conditions S J M

A75-35161 **Stability and change in a perspective reversal illusion** N O Rankin (Clark University, Worcester, Mass) *Perception and Psychophysics*, vol 17, May 1975, p 469-472 18 refs

A phenomenological explanation is presented for the stability and instability of the appearance of the form of objects as a consequence of changes in (1) the spatial position of the observer with respect to the object, and (2) the amount of time the object is observed from a specific spatial position. In support of the explanation, an object was constructed so that it would have multiple appearances when observed continuously from the same viewpoint. The initial appearance of this object when observed from different spatial positions and the constancy over time of these appearances were demonstrated to be in agreement with the theoretical expectations (Author)

A75-35162 **Foreground and background in dynamic spatial orientation** T Brandt, J Dichgans (Neurologische Universitätsklinik, Freiburg im Breisgau, West Germany), and E R Wist *Perception and Psychophysics*, vol 17, May 1975, p 497-503 19 refs Research supported by the Deutsche Forschungsgemeinschaft

The dependency of visually induced self-motion sensation upon the density of moving contrasts as well as upon additional stationary contrasts in the foreground or background was investigated. Using two different optokinetic stimuli, a disk rotating in the frontoparallel plane and the projection of horizontally moving stripes onto a cylindrical screen, it was found that (1) visually induced self-motion depends upon the density of moving contrasts randomly distributed within the visual field and, with a single contrast area of 0.25%, is saturated when about 30% of the visual field is moving, (2) additional stationary contrasts inhibit visually induced self-motion in proportion to their density, and (3) the location in depth of the stationary contrasts has a significant effect upon this inhibition. Their effect is considerable when located in the background of the moving stimuli but weak when appearing in the foreground. It is concluded that dynamic visual spatial orientation relies mainly on information from the seen periphery, both retinal and depth (Author)

A75-35163 **Stimulus compatibility effects of an accessory visual stimulus on auditory sensitivity** T F Seif and J H Howard, Jr (Catholic University of America, Washington, D C) *Perception and Psychophysics*, vol 17, May 1975, p 504-510 35 refs NSF Grant No GU-3285

Studies have reported that an accessory stimulus in a second modality can have a facilitative effect on sensory detection in a primary modality. However, performance declines when the subject has the additional task of reporting on the accessory stimulus. The facilitative effect has been attributed to an arousal or warning process, while the interference effect has been characterized as a

result of limited channel capacity. Auditory sensitivity was assessed under accessory visual stimulation. Visual stimulus intensity (arousal), processing demand, and interstimulus compatibility (same or opposite direction of change of primary and secondary stimuli) were manipulated. The results indicated that interstimulus compatibility, not arousal, accounted for the obtained facilitation effect. Interference due to additional task demands was not observed. It was proposed that the facilitation effect was due to selective sensory encoding. (Author)

A75-35179 # Biological flows (Biologische Strömungen) O Mahrenholtz (Hannover, Technische Universität, Hannover, West Germany) (*Gesellschaft für angewandte Mathematik und Mechanik, Wissenschaftliche Jahrestagung, Bochum, West Germany, Apr 1-5, 1974*) *Zeitschrift für angewandte Mathematik und Mechanik*, vol 55, Apr 1975, p T27-T39 69 refs. In German

Biological flows include blood flow and the transportation of lymph. Historical aspects regarding the study of biological flows are briefly considered along with details concerning the blood circulation, questions of blood rheology, and the arterial-high-pressure system. Attention is also given to problems of flow in capillaries, the venous low pressure system, questions of pressure drop and regulation, and peristaltic pumping. G R

A75 35515 A comparison of attentional and control shift models of the performance of concurrent tasks. G G Briggs (Duke University, Durham, N C) *Acta Psychologica*, vol 39, June 1975, p 183-191 15 refs. Grant No. NIH-NS-06233

A concurrent verbal task was superimposed upon the performance of a practiced bimanual motor skill by right-handed Ss. Addition of the verbal task did not increase the total number of errors, however, a significant interaction between hands and conditions was observed. The right hand made significantly more errors under the verbal condition, while the left hand made nonsignificantly fewer errors under that condition. These findings were interpreted as supporting an attentional model rather than a model which proposes that addition of the verbal task causes control of the right hand to shift to the nonverbal right hemisphere. (Author)

A75-35516 # Sketch of biological aero-hydrodynamics /Flight and swimming of animals/ (Ocherk biologicheskoi aero- i gidrodinamiki /Polet i plavanie zhivotnykh/) N V Kokshanskii Moscow, Izdatel'stvo Nauka, 1974 256 p 376 refs. In Russian

Results of numerous studies on the flight and swimming of animals are critically analyzed. The flight of insects, birds, and bats and the swimming of fish and aquatic mammals are investigated. The efficiency of the locomotive systems of these animals and the energetics of flight and swimming are analyzed. The relationship of biomechanics to general technological progress is discussed. P T H

A75-35601 International Symposium on Basic Environmental Problems of Man in Space, 5th, Washington, D C, November 27-30, 1973, Proceedings. Edited by A Graybiel (U.S. Naval Aerospace Medical Center, Aerospace Medical Research Laboratory, Pensacola, Fla.) *Acta Astronautica*, vol 2, Jan-Feb 1975 208 p

A number of medical experimental results obtained on astronauts during recent space missions, especially that of Skylab II, are reported. Topics treated include vestibular function in the space environment, reflex contributions to the assessment of the vertical, quantitative electrocardiography during extended space flight, physiological mass measurements on Skylab 1/2 and 1/3, endocrine responses in long duration manned space flight, bone mineral measurement, Skylab experiment M-078, Skylab experiment results, hematology studies, and individual differences in susceptibility to motion sickness among six Skylab astronauts.

S J M

A75-35603 Prospective life-science payloads. P J Lindop (St Bartholomew's Hospital, London, England) (*International Symposium on Basic Environmental Problems of Man in Space, 5th, Washington, D C, Nov 27-30, 1973*) *Acta Astronautica*, vol 2, Jan-Feb 1975, p 15-21

A composite of proposed biomedical Spacelab projects related to apparently unanswered etiology of observed changes in returning astronauts is used to illustrate the evolution of and possible answers to sample problems. Candidates for life-sciences payloads fall into three main groups: gravitational studies, biological rhythms, and biomedicine. It is concluded that a concerted effort must be made towards long term support of space oriented medical research, and that foresight must be exercised to minimize obsolescence of projects undertaken. S J M

A75-35604 Subgravity states - Key to understanding the role of terrestrial gravity in human behaviour. W H Johnson (Toronto, University, Toronto, Canada) (*International Symposium on Basic Environmental Problems of Man in Space, 5th, Washington, D C, Nov 27-30, 1973*) *Acta Astronautica*, vol 2, Jan-Feb 1975, p 23-30 21 refs

Comments are made on some probable relationships between gravity and physiology. Gravity and orientation, motion sickness, and vestibular adaptation are discussed, with emphasis on the last of these topics. Specific directions that could be taken in in-orbit research are proposed. It is concluded that space subgravity biomedical knowledge could have an important impact on understanding of human physiology on earth. S J M

A75-35605 Recent advances in the physiology of whole body immersion. O H Gauer (Berlin, Freie Universität, Berlin, West Germany) (*International Symposium on Basic Environmental Problems of Man in Space, 5th, Washington, D C, Nov 27-30, 1973*) *Acta Astronautica*, vol 2, Jan-Feb 1975, p 31-39 19 refs. Contract No. F44620-71-C-0117

Recent investigations have furnished a complete analysis of the hemodynamic events accompanying whole-body immersion. About 700 ml of blood are translocated into the intrathoracic circulation, and heart volume increases by 180 plus or minus 62 ml. These changes are followed by an increase in stroke volume and cardiac output of over 30%. At the same time a reflex reduction of total peripheral resistance and venous tone occurs. Renin and aldosterone activity are reduced while the 17-hydroxycorticosteroid is not affected. Treatment of the subject with DOCA attenuates but does not extinguish the excess sodium excretion of immersion. This finding strengthens the arguments in favor of an unknown factor enhancing sodium excretion. Finally, the relative activation of the three factors that serve volume control, the excretory function of the kidney, capillary filtration pressure, and the thirst mechanism, is discussed. (Author)

A75-35606 Long-term biological investigations in space. R G A Lotz, U Bertsche (Frankfurt, Universität, Frankfurt am Main, West Germany), and H Fuchs (Bundesministerium der Verteidigung, Bundeswehr, Bonn, West Germany) (*International Symposium on Basic Environmental Problems of Man in Space, 5th, Washington, D C, Nov 27-30, 1973*) *Acta Astronautica*, vol 2, Jan-Feb 1975, p 41-48 8 refs

A life-support system designated 'Biosonde' for the leech (*Hirudo medicinalis*) has been constructed and tested in four sounding rocket flights up to 80 miles of altitude, thus proving its capability for a long-term mission. The Biosonde makes possible inquiries concerning metabolism and motility and their correlation to circadian rhythms. The relationship of metabolic rate in work to that in rest under gravity and zero-gravity conditions, including synergistic effects of the space environment, was of primary interest in the experiments. In all flights, after the Biosonde was recovered on earth, the life-support system met all required functions, and the animals survived the experiment without injuries. Data transmitted by telemetry showed motility of the leeches during the acceleration period and zero-gravity. S J M

A75-35607 * Vestibular function in the space environment

R J von Baumgarten, O Harth, R Thuemler (Mainz, Universität, Mainz, West Germany), G Baldrighi (Michigan, University, Ann Arbor, Mich), and G L Shillinger, Jr (NASA, Ames Research Center, Moffet Field, Calif) (*International Symposium on Basic Environmental Problems of Man in Space, 5th, Washington, D C, Nov 27-30, 1973*) *Acta Astronautica*, vol 2, Jan-Feb 1975, p 49-58 10 refs Contract No NAS2-6057

The present work presents new results about the interdependence of optical illusory sensations and eye movements in man. To establish to what degree certain illusions previously obtained during centrifugation and parabolic flight can be explained by eye movements and by neuronal integration in the brain, real eye movements were measured as they occurred in the dark without optical fixation, during rectilinear accelerations on the ground, and during weightlessness in parabolic flight. Results provide valuable insight into normal vestibular function as well as resolution of within-the-eye and behind-the-eye contributions to the above illusions. S J M

A75-35608 Reflex contributions to the assessment of the vertical T D M Roberts (Glasgow, University, Glasgow, Scotland) (*International Symposium on Basic Environmental Problems of Man in Space, 5th, Washington, D C, Nov 27-30, 1973*) *Acta Astronautica*, vol 2, Jan-Feb 1975, p 59-67

General principles involved in reflex assessment of the vertical, and means of distinguishing between reflex and learned behavior in this area, are discussed. Experiments with decerebrated cats whose cervical spinal nerves C-1 and C-2 had been cut to eliminate the neck reflexes are analyzed, here the labyrinth-controlled limb responses to head tilting were not symmetrical, i.e., the 'downhill' limbs extended and the 'uphill' limbs flexed. Other experiments demonstrated that in the neck reflex, as opposed to the labyrinth effect, the chin limbs extend while the downhill limbs flex. These mutually countering influences enable the head of an animal to be moved freely without altering the limbs or requiring themselves to be switched off. Potential applications of the principles considered to space flight are examined. S J M

A75-35609 * Development of Skylab medical equipment and flight preparations R S Johnston, J C Stonesifer, and W R Hawkins (NASA, Johnson Space Center, Houston, Tex) (*International Symposium on Basic Environmental Problems of Man in Space, 5th, Washington, D C, Nov 27-30, 1973*) *Acta Astronautica*, vol 2, Jan-Feb 1975, p 69-84

The major medical systems in the Skylab orbital workshop are described. They comprise the food system, the waste management system, operational bioinstrumentation, personal hygiene, gas sampling, an inflight medical support system, and a cardiovascular counterpressure garment. Life sciences experiments carried out aboard Skylab are also reviewed; these include an ergometer and metabolic analyzer, a lower-body negative pressure device, an electrode harness and body temperature probe, a blood pressure cuff, a leg volume measuring band, sleep studies, a body-mass measuring device, a rotating litter chair, a blood sample processor, and a small-mass measuring apparatus. All performance requirements were met with the equipment, and no failures were encountered. S J M

A75-35610 * Weightlessness - A case history J P Kerwin (NASA, Johnson Space Center, Astronaut Office, Houston, Tex) (*International Symposium on Basic Environmental Problems of Man in Space, 5th, Washington, D C, Nov 27-30, 1973*) *Acta Astronautica*, vol 2, Jan-Feb 1975, p 85-87

A review of the average bodily systems functioning aboard Skylab II after 20 days of weightlessness is presented. Condition of eyes, ears, nose and throat, gastrointestinal tract, vestibular organs, cardiovascular system, musculoskeletal system, sleep, general appearance, skin, abdomen, and extremities is summarized. The general health of the crewmen is good, although there are some slight

anomalies, such as weight loss, dry skin, nasal speech, and paresthesia of the soles of the feet. S J M

A75-35611 Quantitative electrocardiography during extended space flight. R F Smith, P H King (Vanderbilt University, Nashville, Tenn), K Stanton, D Stoop, and D Brown (US Naval Aerospace Medical Center, Aerospace Medical Institute, Pensacola, Fla) (*International Symposium on Basic Environmental Problems of Man in Space, 5th, Washington, D C, Nov 27-30, 1973*) *Acta Astronautica*, vol 2, Jan-Feb 1975, p 89-102 8 refs

In order to assess the effects of prolonged space flight on the electrophysiological properties of the heart, vectorcardiograms (VCGs) were obtained on the Skylab crews at regular intervals during flight and during the pre- and postflight periods. Changes observed included decreased resting heart rate, increased QRS duration, anterior shift QRS vector, increased QRS vector magnitude, anterior shift T vector, and increased T vector magnitude. With the exception of some cardiac arrhythmia, no deleterious electrophysiological effects were noted during Skylab II. S J M

A75-35612 * Physiological mass measurements on Skylab 1/2 and 1/3 W Thornton (NASA, Johnson Space Center, Houston, Tex) and J Ord (USAF, Clark AFB) (*International Symposium on Basic Environmental Problems of Man in Space, 5th, Washington, D C, Nov 27-30, 1973*) *Acta Astronautica*, vol 2, Jan-Feb 1975, p 103-113 5 refs

Mass measurements of crewmen and objects were made for the first time in space during Skylab. A description of the new devices designed for such measurements and of the technique of their use is detailed. Results from ground-based chamber simulation tests and from those during Skylab II and III show similar patterns of simple metabolic deficits, of a rapid loss during the first few days of flight followed by a reciprocal gain for the first few postflight days, and other transient changes. It is concluded that two major causes of weight loss are present: (1) a fluid redistribution and loss, and (2) metabolic losses. Added to these are short-term changes from transient stress. Smaller, simpler, and cheaper devices have since been designed which should allow mass measurements on virtually any object in almost any spacecraft. (Author)

A75-35613 * Endocrine responses in long-duration manned space flight C S Leach and P C Rambaut (NASA, Johnson Space Center, Houston, Tex) (*International Symposium on Basic Environmental Problems of Man in Space, 5th, Washington, D C, Nov 27-30, 1973*) *Acta Astronautica*, vol 2, Jan-Feb 1975, p 115-127 14 refs

Endocrine measurements to assess the physiological cost of the combined stresses of space flight are considered from two aspects. First, fluid and electrolyte balance are correlated with weight loss, changes in the excretion of aldosterone and vasopressin and fluid compartments. The second area involves estimation of the physiological cost of maintaining a given level of performance during space flight by analysis of urinary catecholamines and cortisol. Inter-individual variability is demonstrated for most experimental indices measured. The measured changes are consistent with the hypothesis that a relative increase in thoracic blood volume upon transition to the zero gravity environment can be interpreted as a true volume expansion resulting in an osmotic diuresis. S J M

A75-35614 * Bone mineral measurement Skylab experiment M-078 J M Vogel (California, University, Davis, Calif) (*International Symposium on Basic Environmental Problems of Man in Space, 5th, Washington, D C, Nov 27-30, 1973*) *Acta Astronautica*, vol 2, Jan-Feb 1975, p 129-139 Contract No NAS9-13589 NASA Order T-93591, NASA Order T-81073

Experimental observations of loss of bone mineral due to prolonged bedrest or weightlessness are reported. A new, precise method was employed that featured an essentially monoenergetic photon source (125I) and a scintillation detector operating in a rectilinear scanning mode to measure bone mineral in the radius, ulna, and os calcis by the absorptiometric technique. Variable but

small losses were found during 4-6 weeks of bedrest, losses of up to 40% were noted in the os calcis after 9 months. When the technique was used during the Apollo 14, 15, and 16 missions, only one crewman showed significant losses in the os calcis and none in the radius or ulna. The variability recorded during bedrest was connected with the initial 24 hr urinary hydroxyproline excretion and the initial os calcis mineral content. The relevance of prediction terms based on bedrest data to Skylab and longer missions is discussed.

S J M

A75-35615 * Skylab experiment results Hematology studies S L Kimzey (NASA, Johnson Space Center, Cellular Analytical Laboratory, Houston, Tex.), S E Ritzmann (Texas, University, Galveston, Tex.), C E Mengel (Missouri, University, Columbia, Mo.), and C L Fischer (Eisenhower Memorial Hospital, Palm Desert, Calif.) (*International Symposium on Basic Environmental Problems of Man in Space*, 5th, Washington, D C, Nov 27-30, 1973) *Acta Astronautica*, vol 2, Jan-Feb 1975, p 141-154 12 refs

Studies were conducted to evaluate specific aspects of man's immunologic and hematologic systems that might be altered by or respond to the space flight environment. Biochemical functions investigated included cytogenetic damage to blood cells, immune resistance to disease, regulation of plasma and red cell volumes, metabolic processes of the red blood cell, and physicochemical aspects of red blood cell function. Measurements of hematocrit value showed significant fluctuations postflight, reflecting observed changes in red cell mass and plasma volume. The capacity of lymphocytes to respond to an in vitro mitogenic challenge was repressed postflight, and appeared to be related to mission duration. Most other deviations from earth function in these systems were minor or transient.

S J M

A75-35616 * Individual differences in susceptibility to motion sickness among six Skylab astronauts A Graybiel, E F Miller, II (U S Naval Aerospace Medical Center, Aerospace Medical Research Laboratory, Pensacola, Fla.), and J L Homick (NASA, Johnson Space Center, Biomedical Research Office, Houston, Tex.) (*International Symposium on Basic Environmental Problems of Man in Space*, 5th, Washington, D C, Nov 27-30, 1973) *Acta Astronautica*, vol 2, Jan-Feb 1975, p 155-174 37 refs NASA Order T 81633

Motion sickness was studied in Skylab crewmen. By mission day 8 (MD 8), astronauts were virtually free of motion sickness symptoms after rotation and linear acceleration tests. None of the Skylab II astronauts (crewmen 1-3) was motion sick aloft, but astronaut 6 of the Skylab III crew experienced motion sickness within an hour after transition into orbit. All three astronauts (4-6) of Skylab III experienced motion sickness in the workshop, where astronaut 6 was most susceptible and astronaut 4 least susceptible. The higher susceptibility of SL III crewmen in the workshop, as compared with SL II crewmen, may be attributable to the fact that they were based in the command module (CM) less than one third as long as were SL II astronauts. I.e., the unnatural movements permitted in the open spaces of the workshop entrained more complex interactions of unusual vestibular and visual stimuli than did those in the CM. The observed reduced liability to kinetosis relative to earth may be due to absence of the gravity stimulus to the otolith organs.

S J M

A75-35622 Improving the training of the air traffic controller through optimum use of simulation R Seifert (Messerschmitt-Bolkow-Blohm GmbH, Munich, West Germany) *Ortung und Navigation*, no 1, 1975, p 45-76

The purpose of this paper is to provide guidelines for an appropriate layout of a radar training simulation concept. The advantages of radar training by simulation over OJT (on-the-job training) are described. A training concept is presented containing the training objectives for the radar simulation, a training syllabus, the number of training hours assigned to the information packages

and a proposal for a pretraining course preliminary to the radar training simulation course. Finally, the implications of the training concept on performance and design requirements for the radar simulator are presented.

(Author)

A75-35749 Relative comprehensibility of pictorial information and printed words in proceduralized instructions H R Booher (U S Naval Air Systems Command, Washington, D C) *Human Factors*, vol 17, June 1975, p 266-277 15 refs

A study was conducted to compare the relative comprehensibility of pictorial information and printed words in instructions. Six picture-word formats were examined using 24 procedural problems on three types of tasks. The formats were print-only, pictorial-only, pictorial-related print, print-related pictorial, pictorial-redundant print, and print-redundant pictorial. The results showed pictorial information important for speed but print information necessary for accuracy. Comprehension of instructions on all three tasks was most efficient with the pictorial-related print and pictorial-redundant print formats but could not be shown to be simply a function of number of visual information channels used or the degree of redundancy between channels. The type of information displayed in the visual channels was found to be important.

(Author)

A75-35750 The Analytic Profile System (APS) for evaluating visual displays A I Siegel (Applied Psychological Services, Inc., Wayne, Pa.), M A Fischl, and D Macpherson (U S Army, Research Institute for the Behavioral and Social Sciences, Arlington, Va.) *Human Factors*, vol 17, June 1975, p 278-288 12 refs Contract No N00014-66 C-0183

The purpose of display evaluation is to estimate the effectiveness of information transfer to the human user of the display. A display evaluation tool called the Analytic Profile System (APS) is developed and tested. APS development is based on multi-dimensional scaling of a set of visual displays, item writing, item favorableness determination, item selection and assembly, reliability evaluation, homogeneity determination, concurrent validity and predictive validity assessment, and comparison of APS results with those obtained from applications of a human engineering checklist. The technique rests on forced-choice methods and is held to possess acceptable psychometric characteristics.

S D

A75-35800 Outflow theory and autokinetic movement - Color, viewing angle, and dark adaptation B Wallace and K B Hoyenga (Western Illinois University, Macomb, Ill.) *American Journal of Psychology*, vol 88, Mar 1975, p 107-115 15 refs Research supported by the Western Illinois University

The number of reported changes in direction of autokinetic movement was assessed as a function of color of the light that served as stimulus, viewing angle (0, 30, or 60 deg of displacement from straight ahead), and dark adaptation. Color and dark adaptation had no significant main effect on the number of reported changes in direction for the red and yellow lights, but viewing angle was inversely related to the number of reported changes. For the blue-green light, atypical effects of viewing angle and dark adaptation were found.

(Author)

A75-35820 An optimal control methodology for analyzing the effects of display parameters on performance and workload in manual flight control S Baron and W H Levison (Bolt, Beranek and Newman, Inc., Cambridge, Mass.) *IEEE Transactions on Systems, Man, and Cybernetics*, vol SMC-5, July 1975, p 423-430 19 refs

An approach to the analysis of the effects of display parameters on manual control based on an optimal control model of the human operator and a related model for task interference is presented. The methodology allows one to predict the effects of changes in display variables on both performance and attentional demand or workload. The methodology is applied to vertical situation displays for STOL (short takeoff and landing) approach-to-landing. Both status displays and displays of command information are examined and compared in terms of approach success probability and workload requirements.

(Author)

A75-35821 **A probabilistic hypothesis for the prediction of visual fixations** M V Srinivasan (Yale University, New Haven, Conn), M A L Thathachar, and B L Deekshatulu (Indian Institute of Science, Bangalore, India) *IEEE Transactions on Systems, Man, and Cybernetics*, vol SMC-5, July 1975, p 431-437 17 refs

A hypothesis is proposed that predicts regions where fixations are most likely to occur on a visual pattern viewed by a human test subject. A scheme is developed for evaluating a fixation probability density function for any given pattern consisting of a single dot. Predictions of the hypothesis agree with experimental data available in the literature. When the hypothesis is used in conjunction with some assumptions, it also provides interpretations for some well-known geometrical illusions, such as the Muller-Lyer illusion. It is hoped that a study of this kind will aid in understanding some aspects of the mechanisms subserving human visual pattern recognition.

(Author)

STAR ENTRIES

N75-24293*# Kanner (Leo) Associates Redwood City Calif
SOYUZ-16 BIOLOGICAL EXPERIMENTS
 B Gerasimov et al Washington NASA 19 May 1975 51 p
 refs Transl into ENGLISH from various Russian articles
 (Contract NASw-2481)
 (NASA-TT-F-16356) Avail NTIS HC \$4 25 CSCL 06M

Five biological experiments were conducted by the crew of the Soyuz-16 flight Two of the experiments are scheduled for the joint flight microbial exchange and zone-forming fungi Microbe exchange consisted of taking samples from the cosmonauts and the craft Another microbial experiment studied the effects of weightlessness on the growth of a culture, the microorganisms in space seemed to grow more slowly than control samples on earth The effects of weightlessness on formation of the vestibular apparatus were studied, Danio rerio eggs were used Development of the embryo in space was arrested at various stages and will be compared to normal development on earth Genetic development of higher plants in weightlessness was also studied Crepis and Arabidopsis seeds were germinated in space growth was arrested before landing It was mentioned that similar experiments had been conducted by Skylab astronauts

Author

N75-24294*# Naval Biomedical Research Lab, Oakland Calif
STUDIES ON PROPAGATION OF MICROBES IN THE AIRBORNE STATE Annual Report, 1974-1975
 R L Dimmick H Wolochow and M A Chatigny 1975 6 p
 ref
 (Contract NASw-13450)
 (NASA-CR-142757 QPR-4) Avail NTIS HC \$3 25 CSCL 06M

C-14 metabolic studies on an aerosol mixture of Escherichia coli and a coliphage are indicative of phage production G G

N75-24295*# Scientific Translation Service Santa Barbara, Calif
SEVERAL QUESTION OF THE PHYLOGENY AND SYSTEM OF LACERTILIA (SEU SAURIA)
 V B Sukhanov Washington NASA May 1973 20 p refs
 Transl into ENGLISH from Zool Zh (USSR) v 40 no 1 1961 p 73-83
 (Contract NASw-2483)
 (NASA-TT-F-16354) Avail NTIS HC \$3 25 CSCL 06P

Lizard musculature is shown to demonstrate radically different structural types of locomotor apparatus scincogeckonomorphous and iguanomorphous Locomotion of the order Geckota can also be divided into two types crawling and a locomotion by which the body, when moving is raised high above the ground It is suggested that Geckota and Scincomorpha are different branches of the same line of evolution The arboreal nature lizard life is seen as the possible cause of the highly modified locomotor apparatus

Author

N75-24296*# Naval Biomedical Research Lab Oakland Calif
STUDIES ON POSSIBLE PROPAGATION OF MICROBIAL CONTAMINATION IN PLANETARY ATMOSPHERES Quarterly Report, 1 Feb - 30 Apr 1975
 R L Dimmick H Wolochow and M A Chatigny 30 Apr 1975 5 p Prepared in cooperation with Calif Univ, Berkeley
 (NASA Order W-13450)
 (NASA-CR-142825 QR-1) Avail NTIS HC \$3 25 CSCL 06M

Maintained aerosols were studied to demonstrate the metabolism and propagation of microbes in clouds which could occur in the course of a probe of a planetary atmosphere Bacteriophage was used as a tool to test whether the mechanisms for DNA production remain intact and functional within the

airborne bacterial cell In one test method, bacteria were mixed with coliphage in an atomizer to allow attachment before aerosolization, in another two suspensions were atomized separately into a common air stream prior to aerosolization Results show that biochemical and physiological mechanisms to allow aerobic microbes to propagate in the airborne state do exist

Author

N75-24297# Advisory Group for Aerospace Research and Development Paris (France)
MEDICAL REQUIREMENTS AND EXAMINATION PROCEDURES IN RELATION TO THE TASKS OF TODAY'S AIRCREW COMPARISON OF EXAMINATION TECHNIQUES IN NEUROLOGY, PSYCHIATRY AND PSYCHOLOGY WITH SPECIAL EMPHASIS ON OBJECTIVE METHODS AND ASSESSMENT CRITERIA

H Oberholz ed (Flugmedizinisches Inst der Luftwaffe Fuerstentfeldbruck, West Germany) Mar 1975 100 p refs In ENGLISH partly in FRENCH Presented at the Aerospace Medical Panel Meeting, Naples 16-20 Sep 1974
 (AGARD-CP-153) Avail NTIS HC \$4 75

Papers presented at the conference are given Topics discussed include Rorschach tests computer measurement of complex performance nonvisual task processing pulse wave velocity and psychophysiological reaction patterns catecholamine excretion from air cadets flight fitness fast analytical techniques for the EEG impact of multivariate analysis on the aviation selection psychic health and flying fitness examinations and military aviation psychiatry and neurology

N75-24298 Advisory Group for Aerospace Research and Development Paris (France)
TEST FOR QUICK AND EARLY DETECTION OF PSYCHIC SYNDROMES MORE FREQUENT IN THE AIR FORCE PERSONNEL

Luigi Longo (Italian Air Force Appeal Medical Board) In its Med Requirements and Exam Procedures in Relation to the Tasks of Today's Aircrew Mar 1975 4 p refs

Results and observations are presented which are derived from a test known as a test of three random dots The test was used to detect early symptoms and psychopathological tendencies in order to prevent their development The following points were considered in analyzing the results of the tests the order of distribution of the 3 dots the type of figure gained by joining the 3 dots, the maximum distance between the lateral dots and the quadrant of paper in which the center of the figure appears M J S

N75-24299 Advisory Group for Aerospace Research and Development Paris (France)
ADMINISTRATION OF THE RORSCHACH TESTS TO A SAMPLE OF STUDENT PILOTS TRAINING APPRENTICESHIP [COMPORTEMENT AU TEST DE RORSCHACH D'UN ECHANTILLON D'ELEVES PILOTES EN PHASES SUCCESSIVES D'APPRENTISSAGE]
 Fabrizio Sparvieri (Schools of the Italian Air Force) In its Med Requirements and Exam Procedures in Relation to the Tasks of Today's Aircrew Mar 1975 3 p refs In FRENCH

The Rorschach Test was administered to 138 student pilots 77 were in academic training and 61 were in flying training Stress and fatigue effects on the quality of student response were compared It was determined that students in flying training supplied more answers but of less quality than those in academic training It was suggested increased psychological stress and fatigue induced by flight situations was the cause of such responses Transl by E H W

N75-24300 Naval Aerospace Medical Research Lab Pensacola Fla
COMPUTER MEASUREMENT OF COMPLEX PERFORMANCE
 Richard S Gibson In AGARD Med Requirements and Exam Procedures in Relation to the Tasks of Today's Aircrew Mar 1975 7 p refs

A series of computer controlled performance measurement tests using response latency measures were developed. Three types of performance tasks were used in these tests: an experimenter-paced complex discrimination task, a subject-paced complex discrimination task, and an experimenter-paced stress task. Each task is capable of being presented separately or in conjunction with other tasks. This quality permits the assessment of performance changes as the test environment is changed from a simple single task situation to an increasingly complex multiple task situation. The results indicate that response times under complex conditions are much longer than under simpler task conditions. Task interactions and the need to divide attention greatly increase the time required to respond to any test situation. Some individuals appear to be more able to cope with time-shared conditions than others. In general, the data indicate that much of the traditional human performance data may grossly overestimate performance levels obtainable under real-world conditions.

Author

N75-24301 Organization for Health Research, TNO Amsterdam (Netherlands) Lab for Ergonomic Psychology
CHANGES IN VISUAL EVOKED RESPONSE BY NON-VISUAL TASK PROCESSING
J L Blom / In AGARD Med Requirements and Exam Procedures in Relation to the Tasks of Today's Aircrew Mar 1975 11 p refs

The influence of an auditory binary choice task on the visual evoked response (VER) in man is analyzed. The separation of task and test stimulus and the processing techniques used enabled the demonstration of a significant difference between task and resting conditions, especially in the amplitude levels of wave IV. These observations, together with data from literature, form the basis of a neurophysiological hypothesis advanced to explain the responsible mechanisms. It is postulated that, in the waking state, the reticular formation can only be in two states: designated resting and busy, which are responsible for the cortical processing of information. The busy state occurs when information is processed and is maintained by cortico-reticular activity during this state. If this activity has been maintained during a certain period of time, return to the resting state is delayed, changing the VER in the period immediately following mental activity.

Author

N75-24302 Organization for Health Research, TNO Amsterdam (Netherlands) Lab for Ergonomic Psychology
PULSE WAVE VELOCITY OVER THE VASCULAR WALL AS A MEANS FOR DISTINGUISHING BETWEEN DIFFERENT PSYCHOPHYSIOLOGICAL REACTION PATTERNS TO A MENTAL TASK
C H J M Opmeer / In AGARD Med Requirements and Exam Procedures in Relation to the Tasks of Today's Aircrew Mar 1975 7 p

The influence of a quantitative task of a predominantly mental nature on pulse wave velocity (PWV) was investigated. The time which the pulse wave (caused by the pumping action of the heart) needed to travel along the vascular wall (from heart to right ear lobe) generally decreased (i.e. PWV increased) during a 75 choices per min task. It seems possible to distinguish two groups: those subjects showing a decreased PWV (supposed to indicate arterial vasoconstriction) and those showing an increased PWV (supposed to be caused by vasodilatation). The continuous PWV-time series appears to be quite irregular (mean SD 16 ms). A Fourier-analysis performed on these data indicates that the observed increase in the number of oscillations during a heavy task is due to an influence of augmented respiratory rate during this task.

Author

N75-24303 Centro di Studi e Ricerche di Medicina Aeronautica e Spaziale, Rome (Italy)
CATECHOLAMINE EXCRETION FROM AIR CADETS
G Paolucci and G Blundo / In AGARD Med Requirements and Exam Procedures in Relation to the Tasks of Today's Aircrew Mar 1975 3 p refs

As every stress can produce rise in catecholamine rate (as adrenal gland response), these substances in aviators during training were analyzed in order to establish whether the flight could have some influence in their output. The assessment of

the data obtained results in the conclusion that, in air cadets first flying missions, act as a stress since the catecholamine excretion increases 4 times in comparison with basic values, collected during nonflying duty.

Author

N75-24304 Centro di Studi e Ricerche di Medicina Aeronautica e Spaziale, Rome (Italy)
FLIGHT FITNESS AND PSYCHO-PHYSIOLOGICAL BEHAVIOR OF APPLICANT PILOTS IN THE FIRST FLIGHT MISSIONS

Cesare A Ramacci and Paolo Rota / In AGARD Med Requirements and Exam Procedures in Relation to the Tasks of Today's Aircrew Mar 1975 8 p refs

The psycho-physiological behavior of 73 applicant pilots was studied during the flights of a basic training course. On ground and during the 1st, 7th and 15th mission, the trainees carried out arithmetic calculation consisting of progressive subtractions and tracked a given outline. In the same missions, in a few trainees, heart rate was continuously recorded with magnetic tape electrocardiograph, and related to flight tasks. The data obtained are discussed with respect to the results of flight final tests, preliminary psychological selection, and previous flight experience in order to evaluate their importance to flight fitness assessment.

Author

N75-24305 Royal Air Force Inst of Aviation Medicine, Farnborough (England)
SOME FAST ANALYTICAL TECHNIQUES FOR THE EEG

G H Byford / In AGARD Med Requirements and Exam Procedures in Relation to the Tasks of Today's Aircrew Mar 1975 10 p refs

Three fast single or multichannel techniques were developed and investigated. The shape and size of an electrical signal may be described by means of the amplitude probability density. This statistical characteristic can be calculated on-line for several channels simultaneously, and techniques are available to detect significant differences between one epoch and another of the same channel or between epochs from different channels. Using a small analogue computer, the signal from a single channel may be divided into 5 frequency bands approximating the accepted physiological definitions, for each the time course of the integral of signal variance is then plotted automatically at up to 16 times real-time, and the slopes of the curves used to obtain numerical indices of change in EEG activity. It is intuitively satisfactory to describe the EEG in terms of amplitude, frequency and time, but no simple graph will display the interrelationship between these 3 variables. The power spectral density describes the relationship between frequency and amplitude in one epoch; successive spectra can be organized so as to produce a 3 dimensional display, and a technique based on the fast Fourier transform was devised which will satisfactorily decrease the spectral density computer time by a factor of up to 100. In order to carry out these calculations with adequate speed, a hybrid computing system was developed which may be controlled either from an on-line experiment or from an index placed on one track of an analog FM recording; results are presented as graphs or printed tables.

Author

N75-24306 Naval Aerospace Medical Research Lab, Pensacola, Fla
IMPACT OF MULTIVARIATE ANALYSIS ON THE AVIATION SELECTION AND CLASSIFICATION PROCESS

Norman E Lane and Rosalie K Ambler / In AGARD Med Requirements and Exam Procedures in Relation to the Tasks of Today's Aircrew Mar 1975 7 p refs

Continuous quality control which has evolved from the massive use of multivariate statistical techniques made possible by modern computer technology is described along with the selection and classification process from the first coarse screen at widely separated procurement points through the first fleet assignment. Emphasis is on the role of multivariate analysis in the development of statistical forecasts of performance for various points in time within each training option. Among the multivariate techniques

that were employed are factor analysis multiple group discriminant function and multiple regression analysis Multiple regression analysis is the most productive and is the principal technique currently used to produce the many series of successive prediction equations which combine quantitative and qualitative data from numerous sources Comparisons of the multiple regression prediction model with other techniques are made and refinements developed in use of this technique are discussed These refinements are concerned with minimizing the impact of sampling error on validity the handling of potential suppressors and the development of decision rules for variable selection These decision rules encompass the practical demands of the training situation as well as the mathematical properties of the potential predictors

Author

N75-24307 Direction des Recherches et Moyens d'Essais Paris (France)

STANDARDIZATION OF OBJECTIVE MEDICO-PSYCHIATRIC QUESTIONNAIRE IN THE FRENCH ARMY [UN QUESTIONNAIRE MEDICO-PSYCHIATRIQUE OBJECTIF STANDARDISE DANS L'ARMEE FRANCAISE]

Louis Crocq *In* AGARD Med Requirements and Exam Procedures in Relation to the Tasks of Today's Aircrew Mar 1975 7 p *In* FRENCH

An objective questionnaire based on data from the psychiatric neurological medical, and social history was developed and administered to French Army personnel Upon completion and verification the questionnaire is used for initial selection facilitation of clinical examination and psychological interview, for prognosis of later adaptation and for easier statistical evaluation and computerization of data The possible development of a mental hygiene data storage bank from such material was examined Data are also used to select personnel for specific missions and jobs

Transl by E H W

N75-24308 Institute of Aviation Medicine Fuerstentfeldbruck (West Germany)

PSYCHIC HEALTH A QUANTITE NEGLIGEABLE IN FLYING FITNESS EXAMINATIONS

H P Goerres *In* AGARD Med Requirements and Exam Procedures in Relation to the Tasks of Today's Aircrew Mar 1975 6 p refs

After a comparative analysis of possibilities and results of aptitude diagnoses so far applied to applicants by aviation psychologists experiences gained in routine and psychological follow-up examinations are reported Various suggestions for the accomplishment of periodic psychologic examinations in the German Air Force are offered and discussed emphasizing practicability and effectiveness of the different possibilities in detail It is shown that examinations of this kind could be conducted by the German Air Force without additional expenditures in personnel, provided certain organizational prerequisites are met

Author

N75-24309 Royal Air Force Central Medical Establishment, London (England)

SIXTEEN YEARS EXPERIENCE IN MILITARY AVIATION PSYCHIATRY AND NEUROLOGY

P J O'Connor *In* AGARD Med Requirements and Exam Procedures in Relation to the Tasks of Today's Aircrew Mar 1975 3 p refs

The wastage of aircrew due to psychiatric causes is discussed One approach to psychiatric selection is to forecast how a cadet will withstand the stress of flying on the evidence of his previous life history the approach was investigated Two ways of tackling psychiatric wastage are found to be the physiological measurement of the cadet's ability to adapt to stress, and the acceptance of the fact that the only test for fitness for flying is the flying itself It is found that neurological wastage of aircrew is much smaller than psychiatric wastage, and that routine electroencephalography may further reduce neurological wastage by identifying those likely to develop epilepsy

Author

N75-24310# Chemical Lab RVO-TNO Rijswijk (Netherlands) REACTIVATING POTENCY OF SOME OXIMES TOWARDS PHOSPHYLATED ACETYLCHOLINESTERASE

L P A DeJong 1974 21 p refs
(TDCK-65518 CL-1974-12) Avail NTIS HC \$3 25

Pyridinium-2 aldoximes and bis-pyridinium 4-aldoximes are potent reactivators Bulky substituents at pyridinium nitrogen influence only slightly the reactivating potency of the pyridinium-2 aldoximes Aliphatic and thiadiazolyl oximes studied do not or only very slightly restore the activity of acetylcholinesterase inhibited by Tabun An ester and some amides of oximinoacetic acid turned out to be moderate reactivators towards acetylcholinesterase The other aliphatic oximes and the thiadiazolyl oximes have only a weak reactivating potency

Author (ESRO)

N75-24311# Medical Biological Lab RVO-TNO Rijswijk (Netherlands)

PUNCTUATION OF TRANSCRIPTION IN VITRO OF THE TRYPTOPHAN OPERON OF ESCHERICHIA COLI A NOVEL TYPE OF CONTROL OF TRANSCRIPTION

Hans Pannekoek (Leiden Univ) William J Brammar (Edinburgh Univ) and Peter H Pouwels 1975 37 p refs
(MBL-1975-4 TDCK-65817) Avail NTIS HC \$3 75

Ribonucleic acid (RNA) is transcribed in vitro from DNA of a tryptophan (trp) transducing strain of bacteriophage phi O80 which contains the trp regulatory elements and consists of a polycistronic messenger transcribed from the structural genes and possibly the regulatory region and a separate RNA species which is transcribed from the regulatory region During transcription of the trp operon RNA polymerase frequently is rejected at a specific site ahead of the first structural gene The termination factor is not involved in this process A different protein fraction which specifically stimulates the synthesis of trp enzymes in an in vitro protein-synthesizing system was found to antagonize the abortive synthesis of trp mRNA A model is proposed for the control of transcription by means of a positive control factor

ESRO

N75-24312# Medical Biological Lab RVO-TNO Rijswijk (Netherlands)

IN VITRO SYNTHESIS OF ENZYMES OF THE TRYPTOPHAN OPERON OF ESCHERICHIA COLI PART 2 STUDIES ON THE SPECIFICITY OF INITIATION OF TRANSCRIPTION

P H Pouwels and J VanRotterdam 1975 30 p refs
(MBL-1975-5 TDCK-65816) Avail NTIS HC \$3 75

In vitro synthesis of enzymes of the tryptophan (trp) operon of *Escherichia coli* was studied in an extract prepared from *Escherichia coli* which is programmed with purified DNA from trp transducing phages with mutations that affect the expression of the trp genes in various ways Results show that control of transcription i.e. initiation and termination, is similar in vivo and in vitro

Author (ESRO)

N75-24313# Medical Biological Lab RVO-TNO, Rijswijk (Netherlands)

IN VITRO SYNTHESIS OF ENZYMES OF THE TRYPTOPHAN OPERON OF ESCHERICHIA COLI PART 3 EVIDENCE FOR POSITIVE CONTROL OF TRANSCRIPTION

P H Pouwels and J VanRotterdam 1975 31 p refs
(MBL-1975-6 TDCK-65818) Avail NTIS HC \$3 75

A protein fraction called At (anti termination) factor was isolated from extracts *Escherichia coli* and partially purified The At factor stimulates the synthesis in vitro of anthranilate synthetase an enzyme encoded by two genes of the tryptophan (TRP) operon but has no effect on the synthesis of T7 RNA polymerase and other T7 and T4 coded proteins The At factor stimulates the synthesis of trp mRNA it has no effect on the translation of trp mRNA It is concluded that in vitro transcription of the trp operon is positively controlled

ESRO

N75-24314# Medical Biological Lab RVO-TNO Rijswijk (Netherlands)

A CHANGED ATP-DEPENDENT DNAASE THE CHARACTERIZATION OF THE ENZYME FROM ESCHERICHIA COLI rorA

Bob VanDorp, Rob Benne, and Franco Palitti 1974 24 p refs
(Contract EURATOM-052-65-2-BIAN)
(MBL-1974-38 TDCK-65633) Avail NTIS HC \$3 25

The ATP-dependent DNAses from *Escherichia coli* wild-type and *rorA* were isolated purified and their enzymatic properties compared. The enzymes were found to differ in the amount of ATP that is consumed during DNA degradation. This difference can be influenced by the reaction conditions and the nature of the substrate. Author (ESRO)

N75-24316*# Kanner (Leo) Associates Redwood City Calif
SOME PROCEDURAL PROBLEMS IN AUTOMATIC ANALYSIS OF ELECTROCARDIOGRAMS
N S Molchanov and L V Chireykin Washington NASA 19 May 1975 19 p refs Transl into ENGLISH from *Kardiologiya* (USSR) v 14 no 3 Mar 1974 p 141-147
(Contract NASw-2481)
(NASA-TT-F-16357) Avail NTIS HC \$3 25 CSCL 06B

Five tasks of automatic EKG analysis are listed and five methods of instruction set formation including the medical evaluation method and three methods of verification of EKG characteristics are listed and discussed. The table of advisability of use of various methods of verification as a function of the automatic EKG analysis task is presented. Representation of formalized EKG descriptions and verification of the effectiveness of automatic EKG analysis methods are discussed. Author

N75-24317# Civil Aeromedical Inst, Oklahoma City Okla
PREDICTIVE VALIDITIES OF SEVERAL CLINICAL COLOR VISION TESTS FOR AVIATION SIGNAL LIGHT GUN PERFORMANCE

Karen N Jones (Oklahoma Univ Norman) Jo Ann Steen and William E Collins Jan 1975 14 p refs
(AD-A606792 FAA-AM-75-2) Avail NTIS HC \$3 25

Scores on the American Optical Company (AOC) test (1965 edition) Dvorine test Farnsworth Lantern test Color Threshold Tester Farnsworth-Munsell 100-Hue test Farnsworth Panel D-15 test, and Schmidt-Haensch Anomaloscope were obtained from 137 men with color defective vision and 128 men with normal color vision. The validity of each of these tests in predicting scores on the aviation signal light gun was assessed by using daytime and nighttime administrations of the light gun as the criteria. Two best sets of plates from the AOC and Dvorine tests were selected by calculating a multiple regression equation in a stepwise manner by the nighttime and then the daytime administration of the signal light gun test as the criteria. Author

N75-24318*# Scientific Translation Service Santa Barbara Calif
SPINAL EFFECTS OF AN ELECTRICAL VESTIBULAR STIMULATION IN MAN

M Lacour M Bonnet, and J P Roll Washington NASA May 1975 23 p refs Transl into ENGLISH from *Acta Oto-Laryngol* (Uppsala) v 78, no 5-6 1974 p 399-409
(Contract NASw-2483)
(NASA-TT-F-16314) Avail NTIS HC \$3 25 CSCL 06P

The effects of a bipolar and monaural electrical vestibular stimulation on the excitability of spinal reflexes (monosynaptic reflex of Hoffman) are studied. This stimulation causes an increase in amplitude of H-reflexes. The results demonstrate also a reflex reactivity different for each leg. The facilitation of H-reflex is always higher for the non-preferred leg. The notions of vestibular prevalence and of asymmetrical reflex reactivity in rear limbs are discussed in the framework of a differential central control over symmetrical effector and receptor structures. Author

N75-24319*# National Aeronautics and Space Administration Lewis Research Center Cleveland Ohio
TOXIC SUBSTANCES ALERT PROGRAM
Thomas L Junod Apr 1975 118 p
(NASA-TM-X-71711 E-8329) Avail NTIS HC \$5 25 CSCL 06T

The Toxic Substances Alert Program at the Lewis Research Center is described and a profile of each of the 102 toxic substances procured during a recent 12 month period is given. The goal of the Toxic Substances Alert Program is to ensure

that the health and safety personnel are aware which toxic substances are being used and to alert and inform the users as to their toxic characteristics. The program provides a continuing record of the toxic substances being procured who has procured them what other toxic substances the user has obtained in the past and where similar materials have been used elsewhere at the Center. Author

N75-24320*# Scientific Translation Service Santa Barbara Calif
HOT AIR STERILIZATION
G B Roemer Washington NASA Jun 1975 7 p Transl into ENGLISH from *Deut Med Wochenschr* (West Germany) v 13 no 100, 1975 p 709-710
(Contract NASw-2483)
(NASA-TT-F-16384) Avail NTIS HC \$3 25 CSCL 06E

Different temperature and sterilization times are given for the hot air sterilization of syringes and needles. A temperature of 170 C for 30 minutes or 160 C for 60 minutes was found effective. Prerequisites for maintenance and safety procedures involved in such a process are also included. Author

N75-24321*# Scientific Translation Service Santa Barbara Calif
BIOLOGICAL EXPERIMENTS ON SALYUT-4
Washington NASA 25 Apr 1975 29 p refs Transl into ENGLISH from Russian reports
(Contract NASw-2483)
(NASA-TT-F-16267) Avail NTIS HC \$3 75 CSCL 06S

The biological experiments conducted during the Soyuz-17 - Salyut-4 flight are discussed. Microorganism growth under weightlessness was studied using a coliform bacilli culture. The importance of man's presence during such spaceflights is stressed. Author

N75-24322*# Scientific Translation Service Santa Barbara Calif
THE TESTING OF PERIPHERAL VISION
H Snellen and E Landolt Washington NASA May 1975 37 p refs Transl into ENGLISH from the mono *Handbuch der Gesamten Augenheilkunde* Leipzig W Engelmann v 3 1874 p 52-71
(Contract NASw-2483)
(NASA-TT-F-16312) Avail NTIS HC \$3 75 CSCL 06P

This is a section of a work on ophthalmology. The authors discuss the use of the perimeter and related devices in testing the limits of peripheral vision and of the blind spot as well as testing for peripheral distinction of brightness shape and color. Author

N75-24323*# Scientific Translation Service Santa Barbara Calif
ON ROD VISUAL ACUITY AND CONE VISUAL ACUITY
A Eugen Fick Washington NASA May 1975 24 p refs Transl into ENGLISH from *Arch Ophthalmol* (Berlin) v 45 1898 p 336-356
(Contract NASw-2483)
(NASA-TT-F-16315) Avail NTIS HC \$3 25 CSCL 06P

Measurements of rod and cone visual acuity are presented which confirm the theory of Schultze and von Kries that rods and cones are responsible for dark-adapted and light-adapted vision respectively. Dark adapted visual acuity becomes less with increasing intensity of illumination due to the fact that the stimulus is too strong to be confined to individual rods and spreads to the adjoining ones. Author

N75-24324*# Kanner (Leo) Associates Redwood City Calif
PROBLEMS OF SPACE BIOLOGY VOLUME 26 STATISTICAL ANALYSIS OF THE CARDIAC RHYTHM AND HEMODYNAMIC INDICES IN PHYSIOLOGICAL RESEARCH
A D Voskresenskiy and M D Venttsel Washington NASA May 1975 234 p refs Transl into ENGLISH of the book *Problemy kosmicheskoy biologii* Tom 26 Statisticheskiy analiz serdtshechnogo ritma i pokazateley gemodinamiki v fiziologicheskikh issledovaniyakh Moscow Nauka Press 1974 p 1-221
(Contract NASw-2481)
(NASA-TT-F-16196) Avail NTIS HC \$7 50 CSCL 06P

Possibilities of estimation of the cardiac cycle length from recordings of sequences of interpulse intervals, by the use of digital filtration and correlation analysis methods with the Dnepr

digital computer are discussed. Cardiac rhythm characteristics of healthy people at rest and changes in the characteristics under various experimental conditions such as bed rest, orthostatic tests, increasing CO₂ concentrations and hypoxia, and relationships between the dynamic characteristics of the cardiac rhythm, pneumograms and arterial pressure are discussed. By the use of specific examples of EKG R-R curves and time segments between specific points on the curves recorded on magnetic tape, an analysis is made of a large group of experimental situations, for selection of informative sets of indices and criteria for classification of the observations, leading to demarcation of indices of several states of the cardiovascular system. Remarks are made in conclusion concerning practical use of the formal schemes of classification of observations. Author

N75-24325# Technische Hogeschool Delft (Netherlands) Man-Machine Systems Group

A MULTI-DISCIPLINARY TEAM FOR THE TREATMENT OF PATIENTS WITH DEFECT UPPER EXTREMITIES: A NEED FOR OPTIMAL REHABILITATION

W J Luitse (Rehabilitation Center (De Hoogstraat), Leersum, Netherlands) and H G Stassen Dec 1974 20 p refs (WTHD-67) Avail NTIS HC \$3 25

A multi-disciplinary team is discussed which deals with the problems of amputees and patients with lesions of the plexus cervico brachialis. The growth of such a team and the procedure for treating patients are described. Special attention is paid to the results of the cooperation between research units and rehabilitation centers in the development and research of assistive devices in the problem of acceptance and in the clinical evaluation. The advantages and disadvantages of an orthotic prosthetic team are discussed. Author

N75-24326*# Scientific Translation Service, Santa Barbara, Calif. **EFFECTS OF MUSCULAR EXERCISE ON VARIATION IN PLASMA CORTISOL AND GLUCOSE IN NORMAL MALES** M Follenius and Gabrielle Brandenberger. Washington NASA May 1975 18 p refs. Transl into ENGLISH from the Eur J Appl Physiol (France) no 33 1974 p 23-33 (Contract NASw-2483)

(NASA-TT-F-16257) Avail NTIS HC \$3 25 CSCL 06P

The dynamics of plasma cortisol and glucose levels during and after submaximal muscular exercise was studied at 5-minute intervals and compared to the daytime variations observed at rest. Muscular exercise performed on a bicycle ergometer was shown to modify the normal excretion pattern of plasma cortisol. Glucose concentrations show a transient drop during exercise followed by a rise to the initial level after the end of the muscular activity. The temporal relations between plasma cortisol and plasma glucose concentrations suggest that adaptive reactions of the pituitary-adreno-cortical axis may contribute to the recovery of the initial glucose level. Author

N75-24327*# National Aeronautics and Space Administration Washington D C

ROLE OF METABOLIC SHIFTS IN THE PATHOGENESIS OF VESTIBULAR DISTURBANCES

Yu F Udalov and E V Lapayev Jun 1975 6 p. Transl into ENGLISH from Voenno-med Zh (USSR) no 10 Oct 1974 p 64-66

(NASA-TT-F-16431) Avail NTIS HC \$3 25 CSCL 06S

The effects of certain metabolic shifts due to flight activity on vestibular stability and acceleration tolerance are studied in a series of laboratory and in-flight experiments. The results of these experiments are analyzed, particularly the effects of shifts in protein, pyridoxine and serotonin metabolism on vestibular stability. Metabolic shifts were greater during decreased vestibular tolerance. However, comparison of blood amino acid content during flight days showed unexpected increases in most amino acids in pilots with decreased vestibular tolerance. It is noted that vestibular dysfunction can occur in persons with high vestibular tolerance and is not only due to lack of proper training, but can also be the result of an incorrect diet. Polyvitamins with pyridoxine or special pyridoxine supplements are recommended. Author

N75-24328# Battelle Pacific Northwest Labs Richland Wash [STUDIES ON INSTRUMENTATION, RADIATION AND CHEMICAL PHYSICS, NUCLEAR MEDICINE, AND ARTIFICIAL HEART PROGRAM PART 4 PHYSICAL AND ANALYTICAL SCIENCES] Annual Report, 1973

J M Nielsen Feb 1974 127 p refs

(Contract AT(45-1)-1830)

(BNWL-1850-Pt-4) Avail NTIS HC \$5 75

Separate abstracts were prepared for each of the 4 sections of the report. Publications on the research made during the year are listed. NSA

N75-24329# Medical Biological Lab RVO-TNO Rijswijk (Netherlands)

THE INFLUENCE OF IONIZING RADIATION ON THE IMMUNE RESPONSE [DE INVLOED VAN RADIOACTIEVE STRALING OP IMMUNOLOGISCHE AFWEERMECHANISMEN]

O BrocadesZaalberg 1974 17 p refs. In DUTCH ENGLISH summary

(MBL-1974-28, TDCK-65585) Avail NTIS HC \$3 25

The effects of ionizing radiation on the immune response are reviewed. Following an introduction on the function of the immune apparatus, the effect of radiation in the different cell types of the immune system is described. The possible consequences of these effects on the prognosis of radiation victims are discussed. ESRO

N75-24330# Medical Biological Lab RVO-TNO Rijswijk (Netherlands)

THE CAUSE OF DEATH RESULTING FROM TRANSFUSION RESISTANT SHOCK PART 1 INFLUENCE OF BRAIN DAMAGE [DE DOODSOORZAAK BIJ TRANSFUSIE-RESISTENTE SHOCK 1 DE BETEKENIS VAN DE BESCHADIGING VAN DE HERSENEN]

M Wijnans, J A Luthjens-Neijhoff, and P VanEck 1975 65 p refs. In DUTCH ENGLISH summary

(MBL-1975-1 TDCK-65628) Avail NTIS HC \$4 25

The influence of brain damage on the cause of death resulting from transfusion resistant, ie irreversible shock was investigated in rats. Unanesthetized rats cannulated the preceding day were bled from an artery. In animals bled from the carotid artery (car-group) increased intracranial pressure was the main cause of death, whereas in animals bled from the iliac artery (ilgo-group) the blood pressure steadily declined to 35 mm of Hg, then the cornea reflex disappeared, respiration stopped and the blood pressure suddenly fell to zero. In animals bled from the iliac artery (il40 schedule) the effect of occlusion of one or two carotid arteries was studied. The implications for human pathology are that in patients with insufficient blood supply to the brain a drop in the blood pressure may lead to a sudden increase of pressure on the brain from which death may result. ESRO

N75-24331# Medical Biological Lab RVO-TNO, Rijswijk (Netherlands)

RESPIRATORY AND INTRAPERITONEAL INFECTION OF MICE WITH ENCEPHALOMYOCARDITIS VIRUS EFFECT OF SUBLETHAL X-IRRADIATION ON HOST RESISTANCE AND SURVIVAL

W J C Bogaerts and B J Durville-Vanderoord 1975 23 p refs

(MBL-1975-2 TDCK-65777) Avail NTIS HC \$3 25

The relationships governing host resistance to viral infection were evaluated in mice following respiratory or peritoneal infection with three strains of encephalomyocarditis (EMC) virus which were antigenically similar but differed in virulence. Host resistance to each strain was evaluated by determining the mean lethal dose LD₅₀ and the mean infectious dose ID₅₀. The contribution of non-specific resistance to the overall defense of the host was assessed in mice that had received 450 R of X-irradiation prior to viral infection. Experimental results indicate that host capacity to resist respiratory infection exceeds that for peritoneal infection for the three EMC strains. It is concluded that respiratory inoculation of virus affords better immunization against EMC virus infection than does peritoneal infection. Author (ESRO)

N75-24332# Medical Biological Lab RVO-TNO, Rijswijk (Netherlands)

PROPERTIES OF *uvrE* MUTANTS OF ESCHERICHIA COLI K12 PART 1 EFFECTS OF UV IRRADIATION ON DNA METABOLISM

Cornelis A VanSluis, Ina E Mattern, and M C Paterson 1974 21 p refs Sponsored partly by Med Res Council of Can (MBL-1974-25 TDCK-65293) Avail NTIS HC \$3 25

Escherichia coli K12 *uvrE* is a mutator strain which is highly sensitive to ultraviolet radiation. In an attempt to determine the underlying molecular basis for the UV sensitivity, a mutant and an isogenic wild type strain were compared with regard to several metabolic responses to 254 nm radiation. The introduction of single strand breaks into intracellular DNA after irradiation is normal; however, the rate of excision of pyrimidine dimers as well as of DNA degradation and final rejoining of the strand breaks is lower in the mutant as compared to the repair proficient strain. These data suggest that the *uvrE* gene product may be involved in a reaction between the incision and excision steps in the excision repair process. Author (ESRO)

N75-24333# Medical Biological Lab RVO-TNO, Rijswijk (Netherlands)

PROPERTIES OF *uvrE* MUTANTS OF ESCHERICHIA COLI K12 PART 2 CONSTRUCTION AND PROPERTIES OF *pol* AND *rec* DERIVATIVES

Ina E Mattern and P C Houtman 1974 22 p refs (MBL-1974-26, TDCK-65294) Avail NTIS HC \$3 25

Viability and sensitivity to ultraviolet radiation and X-rays as well as frequency of spontaneous mutations was investigated for some double mutant strains of *Escherichia coli* and compared with parent strains. ESRO

N75-24334# Medical Biological Lab RVO-TNO, Rijswijk (Netherlands)

RADIOSENSITIZATION OF BIOLOGICALLY ACTIVE DNA IN CELLULAR EXTRACTS BY OXYGEN EVIDENCE THAT THE PRESENCE OF SH-COMPOUNDS IS NOT REQUIRED

J J VanHemmen, W J A Meuling, and J F Bleichrodt 1974 22 p refs

(MBL-1974-29 TDCK-65368) Avail NTIS HC \$3 25

The radiosensitization by oxygen of biological active bacteriophage DNA in bacterial extracts was studied. The oxygen effect in such a system appeared not to be due or due only to a minor extent to the presence of endogenous sulfhydryl compounds. The components in a cell extract which enable oxygen and other sensitizers to sensitize DNA could not be destroyed by extremely high doses of gamma radiation. Author (ESRO)

N75-24335# Medical Biological Lab RVO-TNO, Rijswijk (Netherlands)

MUTAGENESIS BY ULTRAVIOLET RADIATION IN BACTERIOPHAGE ϕ X174 ON THE MUTATION STIMULATING PROCESSES INDUCED BY ULTRAVIOLET RADIATION IN THE HOST BACTERIUM

J F Bleichrodt and W S D Verheij 1974 23 p refs (MBL-1974-30, TDCK-65367) Avail NTIS HC \$3 25

The fraction of mutants measured in a population of ultraviolet irradiated bacteriophage ϕ X174 is higher when the mutants are assayed on host cells irradiated with a small dose of UV than when unirradiated cells are used for assay. Evidence is presented that the UV-induced processes in the bacteria which are responsible for the increased number of mutants introduce mutations prior to the replication of the double-stranded replicative form DNA to which the parental single-stranded ϕ X174 DNA is converted after infecting the host cell. These processes also result in an enhanced fraction of spontaneous mutants in unirradiated populations of ϕ X174. Author (ESRO)

N75-24336# Medical Biological Lab RVO-TNO, Rijswijk (Netherlands)

FAST AND EASY PRODUCTION OF MONOLAYER PLAQUE ASSAY SLIDES

Gerard D Majoor (Med Faculteit Maastricht, Neth.) Mars B VantVeer and Otto B Zaalberg 1974 7 p refs (MBL-1974-31 TDCK-65564) Avail NTIS HC \$3 25

A fast and easy method for the production of monolayer plaque-assay slides making use of double adhesive tape, is described. This technique is used for the detection of single antibody forming cells. Author (ESRO)

N75-24337# Medical Biological Lab RVO-TNO, Rijswijk (Netherlands)

AN ALTERNATIVE THERAPY AGAINST ORGANOPHOSPHATE POISONING

O L Wolthuis 1974 23 p refs (MBL-1974-32 TDCK-65575) Avail NTIS HC \$3 25

Respiratory inhibition caused by organophosphate poisoning is only partially antagonized by oxime therapy because of a difficulty of oximes to pass the blood brain-barrier. Medicaments aimed at bridging the period of respiratory failure by converting residual muscular twitches to contractures of sufficient duration for adequate respiratory movements were investigated. A number of semi-synthetic compounds such as 9-anthracic acid are experimented with. Such a therapy would have the advantage of being independent of the peripheral or central nature of the respiratory block. ESRO

N75-24338# Medical Biological Lab RVO-TNO, Rijswijk (Netherlands)

THE INNERVATION OF CHICK STRIATED MUSCLE FIBRES BY THE CHICK CILIARY GANGLION IN TISSUE CULTURE

Jacob Hooisma, Dick W Slaaf, E Meeter and Willem F Stevens 1974 14 p refs Sponsored in part by Found PROMESO and Found for Med Res FUNGO (MBL-1974-33, TDCK-65577) Avail NTIS HC \$3 25

The formation in tissue culture of neuromuscular junctions (synaptogenesis) from the autonomic ciliary ganglion and leg muscle fibers in the chick was investigated. The autonomic ciliary ganglion in the chick contains two types of neurons: only one of which innervates fast striated muscle in the ciliary body and sphincter of the iris. Electrophysiological and pharmacological properties of newly formed junctions, nicotinic in nature, were studied. Results show that junctional innervation is accomplished in 24 hours. ESRO

N75-24339# Medical Biological Lab RVO-TNO, Rijswijk (Netherlands)

PREFERENTIAL RELEASE OF NEWLY SYNTHESIZED ACETYLCHOLINE BY CORTEX SLICES FROM RAT BRAIN

P C Molenaar (Leiden Univ) and R L Polak 1974 20 p refs (MBL-1974-34 TDCK-65584) Avail NTIS HC \$3 25

The release of newly synthesized acetylcholine (ACh) by rat brain cortex slices was studied by incubating the slices for 5 min in a high potassium medium containing C-14 pyruvate in order to label the acetyl moiety and tritiated or deuterated choline to label the choline moiety of ACh. It was found that C-14 ACh as well as tritiated or deuterated ACh immediately after their formation had a greater change of being released than stored ACh. It was concluded that there are two pools of ACh in the tissue, one large, in which the turnover of ACh is slow, and another one small, in which a rapid turnover of ACh takes place and from which it is readily released. An analysis by means of subcellular fractionation of slices immediately after incubation with H-3 choline did not reveal the identity and localization of the small pool, although evidence was obtained that it was localized in the cholinergic nerve endings. ESRO

N75-24340# Medical Biological Lab RVO-TNO, Rijswijk (Netherlands)

PURIFICATION AND CHARACTERIZATION OF AN ENDONUCLEASE FROM CALF THYMUS ACTING ON IRRADIATED DNA

Silvia Bacchetti and Rob Benne 1974 34 p refs (Contract EURATOM-107-72-1-BIAN) (MBL-1974-35 TDCK-65576) Avail NTIS HC \$3 75

An endonuclease acting on DNA exposed to ultraviolet light or gamma-rays was extensively purified from calf thymus. The enzyme has a pH optimum at pH 7.0 to 7.5, acts with equal efficiency in the presence of EDTA or divalent cations (Mg²⁺ or Ca²⁺) is inhibited by NaCl and tRNA and is inactivated

by incubation at 50 C Its molecular weight determined by Sephadex chromatography or SDS-gel electrophoresis is + or - 30000 The enzyme catalyzes the formation of single-strand breaks with 5-phosphate termini in double-stranded DNA irradiated with ultraviolet or gamma-rays It does not act on unirradiated DNA or denatured DNA The enzymatic activity on ultraviolet- and gamma-irradiated DNA is associated with the same protein The site of action of the enzyme in ultraviolet-irradiated DNA is a photoproduct other than pyrimidine dimers and can also be induced by irradiation of the DNA in vivo

Author (ESRO)

N75-24341# Medical Biological Lab RVO-TNO, Rijswijk (Netherlands)

TRANSCRIPTION OF BACTERIOPHAGE MU AN ANALYSIS OF THE TRANSCRIPTION PATTERN IN THE EARLY PHASE OF DEVELOPMENT

Carel Wijffelman and Pieter VanDePutte 1974 29 p refs (MBL-1974-36 TDCK-65586) Avail NTIS HC \$3 75

The direction of transcription of mu phage was determined by RNA-DNA hybridizations between purified mu-RNA and the separated strands of lambda mu hybrid phages The direction of transcription is from the c-gene end of the heavy strand to the beta-end Thermo-inducible defective mu lysogens in which the prophage is deleted from the beta-end have a normal early transcription pattern, but the increase of RNA at later times is absent A defective lysogen still has an early transcription pattern similar to that of the wild type Therefore, it was concluded that the early RNA is transcribed from that region of the mu genome The early mu-RNA synthesis is negatively regulated with a minimum of transcription at 9 minutes after induction

Author (ESRO)

N75-24342# Naval Submarine Medical Research Lab, Groton Conn

SHALLOW HABITAT AIR DIVE SERIES (SHAD 1 AND 2) THE EFFECTS ON VISUAL PERFORMANCE AND PHYSIOLOGY Medical Research Progress Report

Jo Ann S Kenney S M Luria Mark S Strauss Christine L McKay and Helen M Paulson 2 Oct 1974 29 p refs (AD-A007104 NSMRL-793 MRPR-4) Avail NTIS CSCL 06/19

In order to determine the safe depths at which divers can live while breathing air, a battery of medical, physiological and performance tests were administered to subjects who lived for a month in the Nav Sub Med Rsch Lab pressure chamber at 50 ft and at 60 ft The tests included a number of measures of visual physiology and visual performance since many of the symptoms of oxygen toxicity involve the visual system The results showed no decrements in visual acuity or in the size of the field of view at either 50 ft or 60 ft There were no abnormal changes in the EEG during saturation and the only changes in the visual evoked response occurred during excursions from the saturated depth

GRA

N75-24343# Stanford Univ, Calif Inst for Communication Research

HEALTH CARE AND SATELLITE RADIO COMMUNICATION IN VILLAGE ALASKA Final Report, Aug 1971 - Dec 1974

Oswaldo Kreimer Heather Hudson, and Dennis Foote Jun 1974 429 p refs

(Contract N01-LM-1-4718) (PB-238742/1) Avail NTIS HC \$11 25 CSCL 06E

The summary is the first section of the final report of the evaluation of the ATS-1 medical communication system in Alaska The second section introduces the background of these studies and the sociogeographic setting and health situation of the Alaska natives The third section presents the main research findings about both the aides-to-doctor and doctor-to-doctor exchanges about use of the system for medical education, and about its social impact on Bush Alaska A fourth section is devoted to a cost analysis of alternative systems and recommendations The attachments (charts tables data gathering instruments etc) comprise a fifth section

GRA

N75-24344# Washington Univ Seattle Bioelectromagnetics Research Lab

QUANTITATION OF MICROWAVE RADIATION EFFECTS ON THE EYES OF RABBITS AT 2450 MHZ AND 918 MHZ

Arthur W Guy James C Lin Piro O Kramar and Ashley F Emery Jan 1974 52 p refs

(Contract N00014-67-A-0103-0025 NR Proj 201-055)

(AD-A007521 Scientific-2) Avail NTIS CSCL 06/18

Studies on the microwave cataractogenic effects have been going on for many years Despite the multitude of published information on the mechanism and time and power density threshold, very few of these papers present sufficient quantitative results useful for the purpose of extrapolation to man and subsequently establishment of safe human exposure guides The present project was designed to ascertain the conditions and mechanisms of cataract production in laboratory animals by microwave irradiation and to extrapolate quantitatively the animal results to human exposures to provide data for the establishment of realistic safety standards This report describes incident and absorbed power relationships in animal eyes exposed to near zone 2450 MHz and 918 MHz radiation threshold of cataractogenesis effect of general body hypothermia, chronic subthreshold exposure results and a study of the induced temperature rises in the eye

GRA

N75-24345# Washington Univ Seattle Bioelectromagnetics Research Lab

ANALYSIS OF CENTRAL NERVOUS SYSTEM INVOLVEMENT

Eugene M Taylor and Bonnie T Ashleman Jan 1974 11 p refs

(Contract N00014-67-A-0103-0026 NR Proj 201-054)

(AD-A007581) Avail NTIS CSCL 06/18

Nine cats were prepared for the recording of potentials in three brain sites evoked by acoustic and microwave stimuli Locations in which potentials were observed were eighth cranial nerve medial geniculate nucleus and primary auditory cortex The effect of cochlear disablement on these potentials was evaluated Potentials at all sites were abolished by cochlear damage There were no differences between acoustic and microwave stimuli in this regard Data are interpreted as supporting the contention that the microwave auditory effect is mediated at the periphery as are the effects of conventional acoustic stimuli

GRA

N75-24346# Washington Univ Seattle Bioelectromagnetics Research Lab

MEASUREMENT OF ABSORBED POWER PATTERNS IN THE HEAD AND EYES OF RABBITS EXPOSED WITH TYPICAL MICROWAVE SOURCES

Arthur W Guy James C Lin Piro Kramar and Ashley F Emery Jul 1974 5 p refs Presented at the 19th Conf on Precision Electromagnetic Meas London 1-5 Jul 1974

(Contract N00014-67-A-0103-0025, NR Proj 201-055)

(AD-A007524) Avail NTIS CSCL 06/18

The electromagnetic field and power patterns both in and outside the rabbit's head and eye were established by special measurement techniques while the animals were exposed to a 2450 MHz diathermy C director These quantitative measurement techniques were extended to include animals exposed to a broad class of radiation sources such as corner reflectors, slots cavities and horns

GRA

N75-24347# Washington Univ, Seattle Bioelectromagnetics Research Lab

ELECTROPHYSIOLOGICAL EFFECTS OF ELECTROMAGNETIC FIELDS ON ANIMALS

Arthur W Guy James C Lin and C K Chou Jun 1974 45 p refs Presented at the 7th Rochester Intern Conf on Environ Toxicity Rochester N Y Jun 1974

(Contract N00014-67-A-0103-0026, NR Proj 201-054)

(AD-A007520) Avail NTIS CSCL 06/18

The report shows that the conduction and transmission latencies and amplitudes of evoked potentials in both the CNS of anesthetized cats, isolated nerves of cats, and ganglia of rabbits are affected by CW microwaves in a manner very similar to that of localized conduction heat Temperature rises are always

associated with any observable changes of the measured characteristics in the nervous tissues exposed to CW irradiation. Electrophysiological studies on cats indicate that pulsed microwaves interact with mammalian auditory systems in a manner similar to that of conventional acoustic perception. A possible mechanism of microwave interaction is the acoustic energy release from rapid thermal expansion due to power absorption in the gross structure of the head. GRA

N75-24348# Technion - Israel Inst of Tech Haifa Dept of Building Climatology

PREDICTION OF PHYSIOLOGICAL RESPONSES TO WORK, ENVIRONMENT AND CLOTHING Final Technical Report, 1 Jul 1973 - 30 Jun 1974

Baruch Givoni Sep 1974 43 p refs

(Contract DAJA37-73-C-4024 DA Proj 2N0-61102-B-71D) (AD-A007282 TR-1) Avail NTIS CSCL 06/19

A biophysical model has been developed in this research which describes the dynamic time pattern, response of the mean skin temperature to variations in the metabolic rate, ambient climatic conditions and clothing thermophysical properties. From the analysis of experimental results of experiments it has been found that the core-to-skin temperature gradient could be predicted as a function of the metabolic rate, the environmental conditions and the clothing thermophysical properties. This gradient in turn can then serve as basis for the computation of the peripheral conductance. A comparison between the predicted patterns of the mean skin temperature for different combinations of metabolic rates, environmental conditions and clothing with the patterns measured in a series of physiological experiments showed a good agreement between the predicted and measured patterns under conditions of rest and work. GRA

N75-24349# School of Aerospace Medicine, Brooks AFB Tex
LABORATORY ASSESSMENT OF PILOT PERFORMANCE USING NONRATED SUBJECTS AT THREE ALCOHOL DOSE LEVELS Final Report, Mar 1972 - Apr 1974

Peter H Henry James A Flueck, and Malcolm C Lancaster Dec 1974 224 p refs
(AF Proj 7930)

(AD-A007727, SAM-TR-74-27) Avail NTIS CSCL 06/19

To evaluate the effects of drugs and environmental stresses on pilot psychomotor performance, an automated system was developed around a Link GAT-1 flight trainer. Performance was electronically scored during 1-hour simulations of cross-country instrument flight using special purpose analog and digital logic. The sensitivity of this system was assessed by observing the acute effects of three graded doses 0.3, 0.6 and 0.9 gm/kg body weight, of ethyl alcohol on scored performance. Three separate experiments were conducted using a total of 22 male subjects ages 21 to 29. GRA

N75-24350# Aerospace Medical Research Labs Wright-Patterson AFB Ohio

HUMAN TEMPORARY THRESHOLD SHIFT AND RECOVERY FROM 24 HOUR ACOUSTIC EXPOSURES

Charles W Nixon David W Krantz and Daniel L Johnson Jan 1975 25 p refs
(AF Proj 7231)

(AD-A007842, AMRL-TR-74-101) Avail NTIS CSCL 06/16

The effects on hearing sensitivity of 24 hour monotic exposures to a narrow band noise with the center frequency at 1000 Hz at sound intensities of 80, 85, and 90 db(A) were evaluated. Automatic audiometry was used to assess changes in hearing from baseline levels for six test frequencies during exposure and during subsequent recovery. Among the results (1) TTS (Temporary Threshold Shift) growth and recovery was present for 1000, 1500, and 2000 Hz test frequencies only (2) TTS reached a maximum or asymptote between 8 and 16 hours exposure (3) TTS induced by the 85 and 90 db(A) exposure levels exceeded the limits specified by CHABA (Committee on Hearing, Bioacoustics and Biomechanics) damage risk criteria and (4) long duration exposures of 85 and 90 db(A) require at least 24 hours of rest prior to subsequent exposure. GRA

N75-24351# Environmental Protection Agency, Arlington, Va Office of Noise Abatement and Control

INFORMATION ON LEVELS OF ENVIRONMENTAL NOISE REQUISITE TO PROTECT PUBLIC HEALTH AND WELFARE WITH AN ADEQUATE MARGIN OF SAFETY Final Report

Mar 1974 175 p refs

(PB-239429/4 EPA-550/9-74-004) Avail NTIS MF \$2.25 SOD HC \$4.60 as EP1 2 N69/26 CSCL 06S

Noise levels consistent with the protection of public health and welfare against hearing loss, annoyance and activity interference are identified. GRA

N75-24352# Bureau of Radiological Health, Rockville Md
BIOLOGIC EFFECTS AND HEALTH HAZARDS OF MICROWAVE RADIATION

Oct 1973 362 p refs Proc of an Intern Symp Warsaw 15-18 Oct 1973 Sponsored by WHO and Min of Health and Soc Welfare Warsaw

(PB-239554/9) Avail NTIS HC \$10.00 CSCL 06R

The symposium was held to facilitate the exchange and evaluation of current information about the biologic and health effects of microwave radiation, and in this way to focus attention on those areas in which additional information is needed and new approaches can be developed. Sixty participants from 12 countries took part and 30 scientific papers were presented during the 4-day period October 15-18 1973. GRA

N75-24353# American National Standards Inst, New York
GENERAL SAFETY STANDARD FOR INSTALLATIONS USING NON-MEDICAL X-RAY AND SEALED GAMMA-RAY SOURCES, ENERGIES UP TO 10 MeV

E H Eisenhower Feb 1975 70 p refs Revised Sponsored in part by NBS Washington D C

(COM-75-50166/8 ANSI-n543-1974-Rev NBS-H-114-Rev) Avail NTIS MF \$2.25 SOD HC as C13 11 114 CSCL 18F

Requirements for the design and operation of common types of installations which use gamma and X-radiation for non medical purposes are established to protect persons who work with or are near such installations, as well as the general public, against excessive exposure to radiation. Maximum permissible dose limits established by the National Council on Radiation Protection and Measurements are cited. Methods for achieving adequate radiation protection are described including structural details, surveys and inspections, and operating procedures. GRA

N75-24354# General Applied Science Labs, Inc Westbury NY

PSYCHOPHYSICAL TESTS OF POTENTIAL DESIGN/CERTIFICATION CRITERIA FOR ADVANCED SUPERSONIC AIRCRAFT Final Report

Thomas H Higgins and Earnest A Sanlorenzo Feb 1975 83 p refs

(Contract DOT-FA73WA-3203)

(AD-A009296 GASL-789, FAA-RD-75-10) Avail NTIS HC \$4.75 CSCL 06S

A subjective evaluation of simulated sonic booms heard indoors and outdoors has been carried out to assess the validity of a simple formulation for estimating perceived noise levels. Using a psychoacoustic experiment design based on magnitude estimation of the perceived level, it was shown that the subjective response was consistent with the predictions of both the simple formula for PLdb as well as PLdb determined from an analysis of the sonic boom stimuli using the MARK VII procedure. With regard to acceptability of the sonic boom, it was found that the sonic boom when heard indoors was significantly less acceptable than when heard outdoors for the same level of PLdb. In particular, the present data indicate (1) 90 PLdb(1) when heard inside and measured outside is acceptable to 98% of the subjects tested (2) when heard inside and measured inside the PLdb(1) and 98% acceptability is equivalent to 69 PLdb(1) (-21 PLdb attenuation) and (3) heard outside and measured outside 90 PLdb(1) is acceptable to 80% of the tested subjects. Author

N75-24355# Technische Hogeschool, Delft (Netherlands) Man-Machine Systems Group

ON THE ACCEPTANCE, FUNCTIONAL GAIN AND MENTAL

LOAD IN ARM PROSTHESIS AND ORTHOSIS CONTROL
M Soede (Organization for Health Research TNO Amsterdam)
J S M J VanDieten and H G Stassen Nov 1974 20 p
refs
(WTHD-66) Avail NTIS HC \$3 25

The problem of acceptance of arm prostheses and orthoses is discussed. Available clinical and field data show that only a very small percentage of prostheses for upper extremities are really worn by patients, one of the reasons may be the large amount of attention needed to control and to use these devices. This can lead to a lack of attention to other tasks which in turn may be explained in terms of mental load. A preliminary experiment to measure the reduction of attention caused by controlling an arm prosthesis is discussed. Further research is proposed in order to gain optimal design rules to define better criteria to prescribe prostheses, and to set up optimal training programs. Author

N75-24356# Naval Air Development Center, Warminster, Pa
Air Vehicle Technology Dept

A PILOT/LSO SIMULATION CONDUCTED TO INVESTIGATE AIRCRAFT WAVE-OFF PERFORMANCE AND TO DETERMINE THE ABILITY OF THE LANDING SIGNAL OFFICER TO JUDGE AIRCRAFT APPROACHES Final Report

Ronald L Nave 16 Dec 1974 43 p refs
(AD-A007515 NADC-74112-30) Avail NTIS CSCL 01/3

A fixed base carrier landing simulation including both the pilot and the landing signal officer (LSO) was performed to investigate aircraft wave-off performance and to evaluate the functions of the LSO. Minimum aircraft design requirements are recommended based on the simulation results. GRA

N75-24357# Army Aeromedical Research Unit Fort Rucker, Ala

AVIATOR VISUAL PERFORMANCE IN THE UH-1 STUDY 2

Thomas L Frezell Mark A Hofmann Allen C Snow and Richard P Nutt Mar 1975 46 p refs
(Contract F41609-72-C-0037, AF Proj 1138)
(AD-A007812 USAARL-75-11) Avail NTIS CSCL 05/8

The study monitored via the corneal reflection technique visual performance of Army aviators while flying incline maneuvers in a UH-1 helicopter. Visual performance to include time and transition information was gathered over 13 sectors. In addition to visual data, performance measurements were recorded simultaneously on an incremental digital recorder. Results acquired by both techniques are provided. GRA

N75-24358# Arizona State Univ Tempe

VISUAL AND AUDITORY INFORMATION PROCESSING ASPECTS OF THE ACQUISITION OF FLYING SKILL Final Report

Robert C Haygood Barry Leshowitz Stanley R Parkinson and Edward E Eddowes Dec 1974 62 p refs
(Contract F41609-72-C-0037, AF Proj 1138)
(AD-A007721 AFHRL-TR-74-79) Avail NTIS CSCL 05/10

The result of a number of experimental studies of human auditory and visual information processing behavior and their possible relationship to the student pilots acquisition of flying skill were explored in terms of conceptual model developed for this study. The results were interpreted in terms of the potential interfering effects of the intake of and response to information processed during flying tasks and in terms of the student pilot's nonoptimal information processing strategies during his acquisition of flying skill. GRA

N75-24359*# Essex Corp Alexandria Va
DEVELOPMENT AND VALIDATION OF METHODS FOR MAN-MADE MACHINE INTERFACE EVALUATION Final Report

Thomas B Malone and Angelo Micocci Mar 1975 35 p
(Contract NASw-2747)
(NASA-CR-142824) Avail NTIS HC \$3 75 CSCL 05H

The alternate methods of conducting a man-machine interface evaluation are classified as static and dynamic and are evaluated

A dynamic evaluation tool is presented to provide for a determination of the effectiveness of the man-machine interface in terms of the sequence of operations (task and task sequences) and in terms of the physical characteristics of the interface. This dynamic checklist approach is recommended for shuttle and shuttle payload man-machine interface evaluations based on reduced preparation time, reduced data and increased sensitivity of critical problems. Author

N75-24360*# Hamilton Standard Windsor Locks Conn
PHASE 1 ENGINEERING AND TECHNICAL DATA REPORT FOR THE THERMAL CONTROL EXTRAVEHICULAR LIFE SUPPORT SYSTEM

Mar 1975 329 p refs
(Contract NAS9-13574)
(NASA-CR-141793 HSPC-75 T05) Avail NTIS HC \$9 50 CSCL 06K

A shuttle EVLSS Thermal Control System (TCS) is defined. Thirteen heat rejection subsystems, thirteen water management subsystems, nine humidity control subsystems, three pressure control schemes and five temperature control schemes are evaluated. Sixteen integrated TCS systems are studied and an optimum system is selected based on quantitative weighting of weight, volume, cost, complexity and other factors. The selected subsystem contains a sublimator for heat rejection, a bubble expansion tank for water management and a slurper and rotary separator for humidity control. Design of the selected subsystem prototype hardware is presented. Author

N75-24361*# Scientific Translation Service Santa Barbara, Calif
CENTER FOR TECHNICAL SUBMARINE STUDIES AND RESEARCH

Washington NASA Jun 1975 10 p refs Transl into ENGLISH from Descriptive Brochure (France) p 1-18
(Contract NASw-2483)
(NASA-TT-F-16385) Avail NTIS HC \$3 25 CSCL 06K

The major phases of development of the French Center for Technical Submarine Studies and Research are presented. Its main fields of activity are described: life in a confined atmosphere, softwater production, noise measurements, rescue devices, under-water vision, deep-sea exploration. Some indications on present and future projects are given. Author

N75-24362*# Jet Propulsion Lab Calif Inst of Tech Pasadena
PLANETARY QUARANTINE SUPPORTING RESEARCH AND TECHNOLOGY Semiannual Review, 1 Jul - 31 Dec 1974

D M Taylor 18 Apr 1975 119 p refs
(Contract NAS7-100)
(NASA-CR-142878 JPL-900-710) Avail NTIS HC \$5 25 CSCL 22B

Planetary quarantine strategies for advanced missions are described, along with natural space environment studies and post launch recontamination studies. Spacecraft cleaning and decontamination techniques and assay activities are reviewed. Teflon ribbon experiments and pyrolysis gas-liquid chromatography study are also considered. J A M

N75-24363# Defence and Civil Inst of Environmental Medicine Downsview (Ontario) Behavioural Sciences Div
AERODROME AIR TRAFFIC CONTROL IN THE CANADIAN FORCES

L G Innes Nov 1974 29 p refs
(DCIEM-74-R-1067) Avail NTIS HC \$3 75

Analysis of the functions performed by Canadian Forces air traffic controllers is the basis for a tower cab design which reduces many of the problems presently encountered in visual control. Comfortable work stations are provided for a crew of up to three people. The design, suitable for use at all CF bases, incorporates solid-state multiplexed communications, cordless lightweight headsets, CRT displays for data and radar information, mechanized traffic data logging, microfiche reference files and chairs specially designed for use by controllers. Author

N75-24364# Technische Hogeschool Delft (Netherlands)
Man-Machine Systems Group

THE LIGHTSPOT OPERATED TYPEWRITER THE EVALUATION OF A PROTOTYPE

H G Stassen M Soede (Organization for Health Research TNO Amsterdam), and W J Luitse (Rehabilitation Centre (De Hoogstraat) Leersum Netherlands) Nov 1974 22 p refs (WTHD-65) Avail NTIS HC \$3 25

The lightspot operated typewriter (LOT) was developed in order to meet the minimum requirement for communication by a certain group of physically disabled. The range of possibilities may be estimated between a simple communication channel with the environment and a professional apparatus. The first prototype was tested clinically during a special evaluation program which was focused on the acceptance of user and environment on the technical functioning and on the mental and physical load of the patient. As a result of this evaluation study a second prototype was developed in order to improve some technical points and to improve the ergonomics of the LOT a character display of 80 characters was added to the system. Author

N75-24365# Universities Center Jackson Miss
ARTIFICIAL HEART CONTROLS SUPPORT Final Report, 1 Aug 1973 - 31 Jul 1974
F M Donovan Jr 1974 83 p refs
(Contract AT(40-1)-4485)
(ORO-4485-2) Avail NTIS HC \$4 75

Detailed design information concerning power and control requirements for the intermediate nuclear powered artificial heart system is presented. In the absence of energy storage the nuclear powered artificial heart must be capable of supplying 3.07 watt of blood power for an indefinite period of time. With energy storage the heart must be able to supply 2.3 watt of blood power for an indefinite period of time with a maximum of 3.07 watt for shorter periods. Regulation of cardiac output in response to atrial pressure is sufficient steady state control provided that the output can go from 5 to 12 liter/min without requiring the atrial pressure to go below -2 mmHg nor above +10 mmHg. The artificial heart must be capable of responding to relatively small changes in atrial pressure within one heart beat and be able to go from 5 liter/min to 12 liter/min within about one minute. Author (NSA)

N75-24366# Raytheon Co Bedford Mass Missile Guidance Lab
ADVANCED HELMET MOUNTED SIGHT STUDY PROGRAM Final Report
Wesley J Haywood Jr and Daniel J McMahon Mar 1975 118 p
(Contract F33615-72-C-1480 AF Proj 7184)
(AD-A007874 AMRL-TR-73-10) Avail NTIS CSCL 19/5

The report discusses the system analysis which is intentionally general and the fabrication of a laboratory model of the helmet mounted sight incorporating the basic principles of operation. The model is designed to demonstrate a capability by logical extension of meeting the objective specification. The objective was met as evidenced by the acceptance tests of the hardware. GRA

N75-24367# Honeywell Inc Minneapolis Minn Systems and Research Center
REAL TIME DISPLAY PARAMETERS STUDY 2 Final Report, Sep 1973 - Sep 1974
Marjorie J Krebs and Leonard Lorence Feb 1975 83 p
(Contract F30602-73-C-0377 AF Proj 6244)
(AD-A007790 RADC-TR-75-43) Avail NTIS CSCL 09/5

The purposes of the study were (1) to explore the effects of prior task-related experience on FLIR (Forward Looking InfraRed) target acquisition and (2) to determine the effects of several real-time imagery related variables on target acquisition. Three groups of subjects were tested including trained FLIR operators, photo interpreters and untrained college students. The thirty subjects were presented with airborne video-taped FLIR imagery which had been edited into 15-second segments. Eleven different targets were included in the stimulus set ranging from large industrial facilities to small military vehicles. Detection

classification and identification time and accuracy were recorded. Scanning patterns were also recorded using the viewing hood oculometer. GRA

N75-24368# McDonnell-Douglas Astronautics Co St Louis Mo
MANUAL CONTROL IN TARGET TRACKING TASKS AS A FUNCTION OF CONTROLLER CHARACTERISTICS A FLIGHT STIMULATOR INVESTIGATION, PHASE 2
James McGuinness Thomas G Drennen, and James G Curtin 15 Sep 1974 97 p refs
(Contract N00014-72-C-0264, NR Proj 196-120)
(AD-A007384, MDC-E1148) Avail NTIS CSCL 05/5

An investigation was conducted of fingertip controllers which were integrated into an aircraft throttle and used in a target acquisition and tracking task. The experimental variables included two types of controllers (force and displacement) and two types of output function (linear and step) under three levels of gain and three levels of target speed. In the evaluation sixteen pilots performed an aircraft control task in addition to a target tracking task in a fixed base flight simulator. Absolute pitch and roll deviations were obtained to measure aircraft control error. Measures of target tracking task performance included target acquisition time and error time on target X and Y axis tracking error overshoots and control reversals. The results demonstrated that the force controller in combination with a step function was associated with a statistically significant increase in acquisition and tracking proficiency when compared to other controller/output function combinations. GRA

N75-24369# California Univ Berkeley Lawrence Berkeley Lab
CHEMICAL EVOLUTION
M Calvin 18 May 1974 45 p refs Presented at the Conf at the Mitsubishi Kasei Inst of Life Sci Tokyo 18 May 1974 Sponsored by ERDA
(LBL-3319 Conf-740576-1) Avail NTIS HC \$3 75

The period in which molecules were being formed and transformed and built up to reach a size and complexity that could contain and sustain the living process leading to life is discussed. The essence of the molecular nature of living things is arrived at by chemical means. An attempt is made to reconstruct those possible processes from what is known about today's chemistry. The elements described in molecular terms begin with the appearance of small molecules (amino acids) then the appearance of polymers of those amino acids and nucleic acids to give large molecules that ultimately have specific structure and then give rise to specific shapes and sizes. This involved the evolution of molecules, the evolution of polymers, the evolution of catalysts, and the evolution of information such that these processes can be repeated over and over again leading to biological evolution. NSA

N75-25503* National Aeronautics and Space Administration Ames Research Center Moffett Field Calif
ROTARY PLANT GROWTH ACCELERATING APPARATUS Patent
Richard D Dedolph, inventor (to NASA) Issued 13 May 1975 11 p Filed 27 Dec 1973

(NASA-Case-ARC-10722-1, US-Patent-3,882,634, US-Patent-Appl-SN-428995 US-Patent-Class-47-1 2 US-Patent-Class-47-39 US-Patent-Class-47-58) Avail US Patent Office CSCL 06C

Rotary plant growth accelerating apparatus for increasing plant yields by effectively removing the growing plants from the constraints of gravity and increasing the plant yield per unit of space is described. The apparatus is comprised of cylindrical plant beds supported radially removed from a primary axis of rotation with each plant bed being driven about its own secondary axis of rotation and simultaneously moved in a planetary path about the primary axis of rotation. Each plant bed is formed by an apertured outer cylinder, a perforated inner cylinder positioned coaxially, and rooting media disposed in the space between A

rotatable manifold distributes liquid nutrients and water to the rooting media through the perforations in the inner cylinders as the plant beds are continuously rotated by suitable drive means
Official Gazette of the U S Patent Office

N75-25504*# Biospherics, Inc. Rockville Md
AUTOMATED MICROBIAL METABOLISM LABORATORY
Annual Report, 1974

Oct 1974 218 p refs

(Contract NASw-2280)

(NASA-CR-142862) Avail NTIS HC \$7 25 CSCL 14B

The labeled release concept was advanced to accommodate a post- Viking mission designed to extend the search to confirm the presence of, and to characterize any Martian life found and to obtain preliminary information on control of the life detected. The advanced labeled release concept utilizes four test chambers each of which contains either an active or heat sterilized sample of the Martian soil. A variety of C-14 labeled organic substrates can be added sequentially to each soil sample and the resulting evolved radioactive gas monitored. The concept can also test effects of various inhibitors and environmental parameters on the experimental response. The current Viking 75 labeled release hardware is readily adaptable to the advanced labeled release concept
Author

N75-25505# Joint Publications Research Service, Arlington Va
SPACE BIOLOGY AND AEROSPACE MEDICINE,
VOLUME 9, NO 2, 1975

5 Jun 1975 162 p refs Transl into ENGLISH from Kosm Biol i Aviakosm Med (Moscow) v 9 no 2 Mar - Apr 1975 p 3-85
(JPRS-64929) Avail NTIS HC \$6 25

Space flight and environmental stress effects on the human component in the man/spacecraft system are considered

N75-25506 Joint Publications Research Service Arlington, Va
RESPIRATORY FUNCTION AND GRAVITATION

G S Belkaniya *In Its Space Biol and Aerospace Med* Vol 9 No 2, 1975 (JPRS-64929) 5 Jun 1975 p 1-10 refs Transl into ENGLISH from Kosm Biol i Aviakosm Med (Moscow) v 9, no 2 Mar - Apr 1975 p 9-12

Changes in the respiratory function following alteration in the spatial position of the body can be considered a specific manifestation of the general mechanism of the antigravity function of the body. These changes are to compensate for the primary mechanical effects of gravity and to satisfy increased energy requirements of the body when standing. The mechanism of increased respiration acting through the somatic component of the antigravity function of the body is of great importance
Author

N75-25507 Joint Publications Research Service Arlington, Va
HYPOXIC HYPOTHERMIA IN THE METABOLISM OF PHOSPHOLIPIDS OF THE ENDOCRINAL ORGANS OF RATS DURING ACUTE HYPOXIA

G A Gribanov *In Its Space Biol and Aerospace Med*, Vol 9, No 2 1975 (JPRS-64929) 5 Jun 1975 p 11-17 refs Transl into ENGLISH from Kosm Biol i Aviakosm Med (Moscow) v 9, no 2, Mar - Apr 1975 p 9-12

The effect of hypoxic hypothermia on the metabolism of phospholipids in the endocrinal organs (thyroid, adrenal testicular glands) of albino rats has been studied. Hypoxic hypothermia which occurs during acute hypoxic produces no inhibitory effect on phospholipid metabolism in the thyroid, adrenal and testicular glands of the test animals. As a result of disturbed heat release the content of phospholipids in the thyroid and adrenal glands increases. The rate of label (P-32) incorporation into the phospholipids of every gland increases noticeably. This indicates an important compensatory role played by hypoxic hypothermia in phospholipid metabolism. The mechanisms of these phenomena are discussed
Author

N75-25508 Joint Publications Research Service Arlington Va
CONTENT OF AMMONIA, GLUTAMINE, GLUTAMIC ACID IN RAT TISSUES DURING HYPOXIA AND AFTERWARD
M M Gabibov *In Its Space Biol and Aerospace Med* Vol 9 No 2 1975 (JPRS-64929) 5 Jun 1975 p 18-24 refs Transl into ENGLISH from Kosm Biol i Aviakosm Med (Moscow) v 9 no 2 Mar - Apr 1975 p 12-16

The content of ammonia glutamine glutamic acid was measured in the brain liver, heart spleen kidneys skeletal muscles and blood of rats exposed to a 4-atm oxygen atmosphere and during aftereffects. The hyperoxic atmosphere resulted in an increase in ammonia and glutamic acid and a decrease in glutamine in the tissues. A return of the compounds to normal levels occurred slowly and nonuniformly, lasting for 40 to 60 days during the post-hyperoxia period
Author

N75-25509 Joint Publications Research Service Arlington Va
GAS EXCHANGE AND SOME BLOOD INDICES ACCOMPANYING THYROID GLAND DYSFUNCTION c52

V P Dudarev V A Kuzmenko and V I Fedorchenko *In Its Space Biol and Aerospace Med*, Vol 9 No 2 1975 (JPRS-64929) 5 Jun 1975 p 25-31 refs Transl into ENGLISH from Kosm Biol i Aviakosm Med (Moscow) v 9 no 2 Mar - Apr 1975 p 16-20

Exposure of intact rats to a hyperoxic atmosphere of 2 atm for one hour a day for a period of 20 days induced no changes in gas exchange or hemoglobin and the content of red blood cells. The concentration of free radicals tended to decrease. Thyroidectomized rats kept in a normoxic atmosphere exhibited anemia and a decrease in gas exchange. The concentration of free radicals in the tissues decreased slightly. These parameters returned to normal after a hyperoxybaric exposure. During a normoxic exposure thyroxin injections accelerated gas exchange producing no significant changes in composition of the red blood. Free-radical activity tended to increase. After a hyperoxybaric exposure similar changes were observed
Author

N75-25510 Joint Publications Research Service Arlington Va
ACID-BASE STATE OF BLOOD WHEN BREATHING HYPERCAPNIC ATMOSPHERES

V A Glazkova and I N Chernyakov *In Its Space Biol and Aerospace Med*, Vol 9 No 2 1975 (JPRS-64929) 5 Jun 1975 p 32-42 refs Transl into ENGLISH from Kosm Biol i Aviakosm Med (Moscow) v 9 no 2 Mar - Apr 1975 p 20-27

The Astrup-Zigaard-Andersen method was used in investigating the acid-base balance in the blood of men and dogs exposed to hypercapnic atmospheres with a normal, increased and decreased oxygen content. A total of 164 experiments was carried out. Variations in acid-base equilibrium were compared with changes in physiological functions. The relationship between the acid-base balance and the carbon dioxide concentration as well as the oxygen concentration in the breathing air was established. The toxic effects of acute hypercapnia and hyperoxia are shown to be cumulative. The positive effect of moderate hypercapnia on tolerance to normobaric hypoxia in long-term experiments is noted
Author

N75-25511 Joint Publications Research Service Arlington Va
MEASUREMENT OF THE AMMONIA CONTENT IN THE ATMOSPHERE OF BIOSATELLITE MOCK-UPS AND ITS STANDARDIZATION

G N Pliskovskaya, A L Germanova N G Ivanov Ye A Ilin, V M Milyavskiy and A D Noskin *In Its Space Biol and Aerospace Med* Vol 9 No 2 1975 (JPRS-64929) 5 Jun 1975 p 43-50 refs Transl into ENGLISH from Kosm Biol i Aviakosm Med (Moscow) v 9 no 2, Mar - Apr 1975 p 27-32

The concentrations of ammonia having an irritating and acute effect on intact and hypokinetic rats were determined. The thresholds of the chronic effect were calculated for each group of animals. A 30-day period of hypokinesia increased animal sensitivity to ammonia. The threshold of the irritating effect decreased by a factor of two. The atmosphere in an enclosure

equipped with an automatic life support system was examined during 30-day integrated animal experiments. Ammonia proved to be the major contaminant. Its concentration increased gradually for the longest part of the experiments (28 days) remaining below the threshold of the chronic effect (40 mg/cu m). Author

N75-25512 Joint Publications Research Service, Arlington, Va. **PECULIARITIES OF ENERGY METABOLISM IN THE CENTRAL NERVOUS SYSTEM UNDER THE COMBINED INFLUENCE OF VIBRATION AND IRRADIATION**
L. D. Lukyanova. *In its Space Biol and Aerospace Med*, Vol. 9, No. 2, 1975 (JPRS-64929) 5 Jun 1975 p 51-58. refs. Transl into ENGLISH from *Kosm Biol i Aviakosm Med* (Moscow), v. 9 no. 2 Mar - Apr 1975 p 32-37.

Vibrations (70 Hz 0.4 mm) have been shown to bring about cyclic changes in functioning of the respiratory chain in brain tissue. Short term (five minute) excitation may stimulate the respiratory function whereas a longer (15 minute) exposure may weaken the energy control. Oxidative processes in the central nervous system and post vibration inhibition of higher cerebral compartments have been found to determine the development of radiation sickness in response to the combined effect of vibration and radiation. Author

N75-25513 Joint Publications Research Service, Arlington, Va. **EFFECT OF MECHANICAL VIBRATION ON THE SURFACE PROPERTIES OF SOLUTIONS OF GAMMA-GLOBULIN**
V. K. Tkach, M. M. Demchenko, and V. T. Zheliba. *In its Space Biol and Aerospace Med*, Vol. 9, No. 2, 1975 (JPRS-64929) 5 Jun 1975 p 59-64. refs. Transl into ENGLISH from *Kosm Biol i Aviakosm Med* (Moscow), v. 9 no. 2 Mar - Apr 1975 p 37-40.

The mechanical effect of vibration on gamma globulin was studied, stressing molecular structure changes. Author

N75-25514 Joint Publications Research Service, Arlington, Va. **TOXICOLOGICAL EVALUATION OF ETHYL ACETATE IN THE ATMOSPHERES OF SEALED CABINS**
G. I. Solomin, G. M. Gorban, Yu. P. Bizin, G. P. Tikhonova, Z. I. Pilyuk, Z. S. Dolgun, and V. A. Shchirskaya. *In its Space Biol and Aerospace Med*, Vol. 9, No. 2, 1975 (JPRS-64929) 5 Jun 1975 p 65-71. refs. Transl into ENGLISH from *Kosm Biol i Aviakosm Med* (Moscow), v. 9 no. 2 Mar - Apr 1975 p 40-44.

Ethyl acetate was studied as an atmosphere contaminant in an enclosed environment. A 90 day continuous experiment on 160 white rats and 120 white mice with three concentrations of the compound (43, 10 and 2 mg/cu m) was carried out. Ethyl acetate used in the first two concentrations caused functional disturbances in the condition of the animals and morphological changes in their internal organs. Ethyl acetate at a concentration of 2 mg/cu m was ineffective. The collected data make possible the formulation of recommendations on the admissible concentrations of ethyl acetate vapors in an enclosed atmosphere in relation to different durations of human exposure. Author

N75-25515 Joint Publications Research Service, Arlington, Va. **CONSERVATION OF FOOD RESIDUES WITH A MIXTURE OF QUINOSOL AND SALICYLIC ACID**
L. N. Rogatina, L. T. Poddubnaya, N. A. Kamennov, I. G. Popov, and P. P. Lobzin. *In its Space Biol and Aerospace Med*, Vol. 9, No. 2, 1975 (JPRS-64929) 5 Jun 1975 p 72-78. refs. Transl into ENGLISH from *Kosm Biol i Aviakosm Med* (Moscow), v. 9 no. 2 Mar - Apr 1975 p 44-48.

A 90 day experiment has shown that a number of toxic gaseous contaminants are released into the atmosphere as a result of storage of mixed food wastes. The microorganisms living on decaying food wastes include different microbial species from the environment and food products. A preserving agent consisting of a mixture of quinosol and salicylic acid (1:1) was used. The agent inhibited microbial activity and terminated decay processes. This was indicated by a decline in the concentration of ammonia and amine compounds. In the presence of the agent

fermentation processes on the contrary, continued and decreased. Author

N75-25516 Joint Publications Research Service, Arlington, Va. **MEDICAL INVESTIGATIONS DURING FLIGHTS OF THE SPACESHIP SOYUZ-12, SOYUZ-13, SOYUZ-14 AND THE Salyut-3 ORBITAL STATION**
N. N. Gurovskiy, A. V. Yerebin, O. G. Gazenko, A. D. Yegorov, I. I. Bryanov, and A. M. Genin. *In its Space Biol and Aerospace Med*, Vol. 9, No. 2, 1975 (JPRS-64929) 5 Jun 1975 p 79-87. Transl into ENGLISH from *Kosm Biol i Aviakosm Med* (Moscow), v. 9 no. 2 Mar - Apr 1975 p 48-54.

Medical results obtained during missions of the Soyuz-12, Soyuz-13 and Soyuz-14 spacecraft and the Salyut-3 orbital station are presented. The subjective feelings of the crew members (blood rush to the head, chest congestion, autonomic disturbances, etc.) and data from in-flight medical monitoring and medical experiments as well as the countermeasures employed are described in detail. Results of post flight medical examinations at rest and using functional tests are also summarized. It is concluded that no abnormalities in the vital physiological functions of crew members developed during the flight. The symptoms typical of the acute period of adaptation to weightlessness disappeared completely after the first flight days. Author

N75-25517 Joint Publications Research Service, Arlington, Va. **RADIATION SAFETY IN FLIGHTS IN HIGH-ALTITUDE AIRCRAFT**
Ye. Ye. Kovalev and V. M. Petrov. *In its Space Biol and Aerospace Med*, Vol. 9, No. 2, 1975 (JPRS-64929) 5 Jun 1975 p 88-95. refs. Transl into ENGLISH from *Kosm Biol i Aviakosm Med* (Moscow), v. 9 no. 2 Mar - Apr 1975 p 54-59.

The major sources of radiation hazard for flights of supersonic high altitude aircraft -- galactic and solar radiation -- are described. Estimates of the equivalent dose rate at different distances from these sources are given. The estimates are compared with the radiation doses allowed for the average population and special personnel. It is concluded that specific measures are needed to provide radiation safety of the crews and passengers aboard supersonic aircraft. Author

N75-25518 Joint Publications Research Service, Arlington, Va. **ACTIVATION OF EXTERNAL RESPIRATION AND THE LEVEL OF ALVEOLAR PCO₂ OF IN-FLIGHT FLIERS**
A. M. Genin, V. N. Polyakov, N. M. Asyamolova, V. K. Stepanov, and V. S. Yakovlenko. *In its Space Biol and Aerospace Med*, Vol. 9, No. 2, 1975 (JPRS-64929) 5 Jun 1975 p 96-104. refs. Transl into ENGLISH from *Kosm Biol i Aviakosm Med* (Moscow), v. 9 no. 2 Mar - Apr 1975 p 59-65.

The appearance of spontaneous hypocapnia in real aircraft flights is discussed. Flight personnel were studied. The hypocapnic state was diagnosed on the basis of the CO₂ concentration in alveolar air measured by using a special unit. In flight the CO₂ concentration in alveolar air decreased insignificantly (by 5 mm Hg on the average). In emergency situations external respiration was activated to a greater extent. It is suggested that the alveolar PCO₂ level is indicative of emotional stress. Author

N75-25519 Joint Publications Research Service, Arlington, Va. **EFFECT OF AN INCREASED OXYGEN AND CARBON DIOXIDE CONTENT ON VESTIBULAR TOLERANCE IN HUMAN SUBJECTS**
S. S. Markaryan and I. A. Sidelnikov. *In its Space Biol and Aerospace Med*, Vol. 9, No. 2, 1975 (JPRS-64929) 5 Jun 1975 p 105-110. refs. Transl into ENGLISH from *Kosm Biol i Aviakosm Med* (Moscow), v. 9 no. 2 Mar - Apr 1975 p 65-68.

Forty-two experiments on 21 test subjects, ages 20 to 40, were carried out to study possibilities of increasing vestibular tolerance. This was achieved by improving the cerebral blood supply of the subjects who breathed air with 40-43% oxygen, 2% carbon dioxide and nitrogen. The results were processed statistically. This respiratory mixture was found to increase

tolerance of the vestibular analyzer to adequate stimuli. It is recommended that this respiratory mixture consisting of 40-43% oxygen, 2% carbon dioxide and nitrogen be used to prevent motion sickness and put an end to vestibular-autonomic disturbances which may appear in persons transported in different flight and surface vehicles. Author

N75-25520 Joint Publications Research Service, Arlington, Va
FUNCTIONAL STATE OF THE VESTIBULAR ANALYZER WITH CREATION OF NEGATIVE PRESSURE ON THE LOWER HALF OF THE BODY

V G Voloshin and E V Lapayev. *In its Space Biol and Aerospace Med*, Vol 9, No 2, 1975 (JPRS-64929) 5 Jun 1975 p 111-116. refs. Transl into ENGLISH from Kosm Biol i Aviakosm Med (Moscow) v 9, no 2, Mar - Apr 1975 p 68-72

Using a caloric test, the functional state of the vestibular analyzer of nine male athletes was investigated during their exposure to lower body negative pressure tests. A prolongation of the latent period of caloric nystagmus and vertigo shortening of nystagmus and vertigo time were observed. It is concluded that the cerebral blood supply plays a major role in the development of vestibular reflexes. Author

N75-25521 Joint Publications Research Service, Arlington, Va
DETERMINATION OF HUMAN ENERGY EXPENDITURES IN CLOSED SPACES

I A Yevdayev and K K Shcherbakov. *In its Space Biol and Aerospace Med*, Vol 9, No 2, 1975 (JPRS-64929) 5 Jun 1975 p 117-119. Transl into ENGLISH from Kosm Biol i Aviakosm Med (Moscow) v 9, no 2, Mar - Apr 1975 p 72-73

A formula is derived for determining energy expenditures of a man present aboard a spaceship. Considered is the volume of released carbon dioxide when breathing pure oxygen or a gas mixture with a high content of oxygen. G G

N75-25523 Joint Publications Research Service, Arlington, Va
COMPUTATION METHOD FOR DETERMINING OXYGEN CONSUMPTION OF A HUMAN SUBJECT IN A CLOSED SPACE

M A Vytchikova, G M Kuzmina, V D Peredkova and B A Chirkov. *In its Space Biol and Aerospace Med*, Vol 9, No 2, 1975 (JPRS-64929) 5 Jun 1975 p 125-130. refs. Transl into ENGLISH from Kosm Biol i Aviakosm Med (Moscow) v 9, no 2, Mar - Apr 1975 p 76-79

The change in partial pressure of carbon dioxide in the microatmosphere of a closed chamber is used for determining oxygen consumption by the human body. G G

N75-25524 Joint Publications Research Service, Arlington, Va
EXOCRINOUS FUNCTION OF THE LIVER OF RATS UNDER THE COMBINED INFLUENCE OF TRANSVERSE ACCELERATIONS AND RESTRICTED MOTOR ACTIVITY

I L Medkova and K V Smirnov. *In its Space Biol and Aerospace Med*, Vol 9, No 2, 1975 (JPRS-64929) 5 Jun 1975 p 131-133. Transl into ENGLISH from Kosm Biol i Aviakosm Med (Moscow) v 9, no 2, Mar - Apr 1975 p 79-80

The combined effect of transverse accelerations and prolonged restriction of motor activity on the principal components of bile secretions in the liver of rats was studied. Author

N75-25525 Joint Publications Research Service, Arlington, Va
REACTION OF NEURONS IN THE VASOMOTOR CENTER OF A CAT TO STIMULATION OF THE VESTIBULAR AND SOMATIC AFFERENTS

S N Malikova and G S Ayzikov. *In its Space Biol and Aerospace Med*, Vol 9, No 2, 1975 (JPRS-64929) 5 Jun 1975 p 134-139. refs. Transl into ENGLISH from Kosm Biol i Aviakosm Med (Moscow) v 9, no 2, Mar - Apr 1975 p 80-83

Experience in space navigation has demonstrated that under spaceflight conditions it is possible to observe vascular reactions

caused by exposure to weightlessness and irritation of the vestibular analyzer. The reaction of spontaneously active neurons of the bulbar vasomotor center to stimulation of the depressor nerve, vestibular and somatic afferents are studied. Author

N75-25526 Joint Publications Research Service, Arlington, Va
RENDERING MEDICAL ASSISTANCE ABOARD A SPACE-SHIP

V G Terentyev and G L Yaroshenko. *In its Space Biol and Aerospace Med*, Vol 9, No 2, 1975 (JPRS-64929) 5 Jun 1975 p 140-142. refs. Transl into ENGLISH from Kosm Biol i Aviakosm Med (Moscow) v 9, no 2, Mar - Apr 1975 p 83-84

An increase in the duration of space flights and enlargement of the crew requires an intensification of attention to the problems involved in the medical support of flights, including investigations directed to the prevention of diseases and prediction of the probability of diseases. It is also necessary to clarify the possibilities and methods for carrying out therapeutic manipulations in a state of weightlessness. By means of mathematical prediction it was possible to determine the probable frequency of different diseases and states in crews consisting of 1 to 15 men on flight with a duration up to 1 to 12 months. Author

N75-25527 Joint Publications Research Service, Arlington, Va
DEPENDENCE OF THE VIABILITY AND MUTABILITY OF CHLORELLA ON POST-RADIATION STORAGE CONDITIONS

I S Sakovich and L K Vekshina. *In its Space Biol and Aerospace Med*, Vol 9, No 2, 1975 (JPRS-64929) 5 Jun 1975 p 143-145. refs. Transl into ENGLISH from Kosm Biol i Aviakosm Med (Moscow) v 9, no 2, Mar - Apr 1975 p 84-85

Chlorella is a possible representative of a closed life support system for a spaceship crew; during the time of flight it will be exposed to cosmic radiation, and in particular, to periodic irradiation from solar flares. The reaction of Chlorella to fractional irradiation is studied in comparison with total single irradiation, and also the dependence of the radiobiological effect on the post-radiation conditions for keeping the culture. Author

N75-25528* Food and Drug Administration, Cincinnati, Ohio
Food Research Lab

ECOLOGY AND THERMAL INACTIVATION OF MICROBES IN AND ON INTERPLANETARY SPACE VEHICLE COMPONENTS Quarterly Progress Report, 1 Oct - 31 Dec 1974. A L Reyes. Mar 1975 16 p. (NASA Order W-13411) (NASA-CR-142909, QPR-39) Avail NTIS HC \$3.25 CSCL 06M

A series of experiments was conducted to determine the dry heat resistance of microorganisms in soil obtained from Denver, Colorado, Pasadena, California, Kennedy Space Center, Florida, and Cincinnati, Ohio. The results of the KSC terminal sterilization cycle experiment are given in graphs. The average number of viable organisms per ml was calculated for 18 replicate soil samples for each sample area and points plotted equivalent to 30 hr exposure at 112 C. The result showed a reduction of 3 logs from the initial population for both KSC and Cincinnati soil samples. Results from other areas are given in graphs. Author

N75-25529* Scientific Translation Service, Santa Barbara, Calif
STERILIZATION OF SOLUTIONS IN CONSIDERATION OF THE DYING KINETICS OF MICROORGANISMS AND THE DESTRUCTION OF SUBSTRATES

H Musielski. Washington: NASA, Jun 1975 16 p. refs. Transl into ENGLISH from Pharmazie (West Germany) v 29, no 12, 1974 p 783-786. (Contract NASw-2483) (NASA-TT-F-16410) Avail NTIS HC \$3.25 CSCL 06M

The sterilization of solutions in blood preservation bottles is analyzed for a process of static cooling and pressure cooling with respect to the explained dying kinetics of microorganisms and the chemical substrate destruction with the inactivation of vitamin B12 as an example. Using the reaction characteristics z and Q sub 10 process integrations are performed for the

killing of microorganisms as well as for the chosen example of a thermochemical substrate destruction. By comparing the obtained data, the pressure cooling process turns out to be the least destructive one for the sterilization of nutrient media and infusion solutions at high sterilization temperatures. Author

N75-25530* National Aeronautics and Space Administration Ames Research Center, Moffett Field Calif

A CONTROL SYSTEM FORMULATION OF THE MECHANISM THAT CONTROLS THE SECRETIONS OF SERUM GROUP HORMONE IN HUMANS DURING SLEEP

James C Howard and Donald R Young Jun 1975 7 p refs (NASA-TM-X-62445, A-6107) Avail NTIS HC \$3.25 CSCL 06P

Plasma growth hormone concentrations during sleep were determined experimentally. An elevated level of plasma growth hormone was observed during the initial phase of sleep and remained elevated for approximately 3 hr before returning to the steady-state level. Moreover, subsequent to a prolonged interruption of sleep, of the order of 2-3 hr, an elevated level of plasma growth hormone was again observed during the initial phase of resumed sleep. A control system formulation of the mechanism that controls the secretions of serum growth hormone in humans was used to account for the growth hormone responses observed. Author

N75-25531* Johns Hopkins Univ., Baltimore, Md Dept of Environmental Medicine

TOXICOLOGIC EVALUATION OF THE MIGRATION OF A PLASTICIZER, DI (2-ETHYLHEXYL) PHTHALATE (DEHP) FROM VINYL PLASTICS Final Report

Robert J Rubin 18 Apr 1975 10 p

(Contract NAS5-22071)

(NASA-CR-143801) Avail NTIS HC \$3.25 CSCL 06C

The intravenous administration of DEHP solubilized by means of a number of different detergents leads to respiratory distress and death in rats. At autopsy the lungs are grossly enlarged, edematous, and hemorrhagic. Light and electron microscopic evaluation of the lungs indicate engorgement of the interalveolar septa with edema fluid and polymorphonuclear leucocytes, degranulation of the leukocytes and progressive destruction of the endothelial and epithelial cells. Consistent with the conclusion that solubilized DEHP results in a syndrome of 'shock lung' is the associated massive fall in arterial blood pressure and the prevention of the lung pathology by pretreatment with pharmacologic doses of an antiinflammatory steroid, methylprednisolone. Evidence is also presented that suggests that the DEHP inadvertently administered to humans during transfusions is also in a solubilized state in the plasma. Author

N75-25532* Johns Hopkins Univ., Baltimore Md Dept of Environmental Medicine

ACUTE PULMONARY PATHOLOGY AND SUDDEN DEATH IN RATS FOLLOWING THE INTRAVENOUS ADMINISTRATION OF THE PLASTICIZER, DI (2-ETHYLHEXYL) PHTHALATE, SOLUBILIZED WITH TWEEN SURFACTANTS

Carl O Schulz, Robert J Rubin and Grover M Hutchins (John Hopkins Hospital) [1975] 35 p

(Contract NAS5-22071)

(NASA-CR-143803) Avail NTIS HC \$3.75 CSCL 06C

Intravenous administration of 200-300 mg/kg of di(2-ethylhexyl)phthalate (DEHP) solubilized in aqueous solutions of several Tween surfactants caused respiratory distress in rats. There was a dose-dependent lethality with death generally occurring within 90 minutes after injection. The lungs from DEHP Tween treated animals were enlarged, generally darkened, and in some cases showed hemorrhagic congestion. Neither the overt symptoms nor the morphologic alterations resulting from DEHP Tween administration could be reproduced by intravenous administration of aqueous Tween solutions alone. The absence of pulmonary abnormalities following the intravenous administration of DEHP as an aqueous emulsion given either alone or even as soon as 2 minutes after pretreatment with Tween 80, suggests that the specific in vivo interaction between DEHP and Tween surfactants depends on the prior formation of water-soluble micelles of DEHP. Author

N75-25533* Princeton Univ., NJ Dept of Biology
RESEARCH ON BIOLUMINESCENCE Final Report, 1970 - 1974

Frank H Johnson 1 Apr 1975 77 p refs

(Contract N00014-67-A-0151-0025, NR Proj 108-860)

(AD-A007924) Avail NTIS CSCL 06/1

The report reviews the research on bioluminescence under the subject contract, briefly listing the luminescence systems of the various types of bioluminescent organisms investigated with the objectives of isolating the determining properties and the chemical structure of the essential reactants, also, the reaction mechanisms and specific products involved in the process of light emission and factors influencing the photon yield. Brief discussions are included concerning accomplishments under previous contracts, as well as the significance of bioluminescence and background of research in this area. GRA

N75-25534* Illinois Univ Chicago Dept of Biological Sciences

OXYGEN CONSUMPTION AND RESPIRATORY QUOTIENT IN FIVE ANIMAL POPULATIONS NATURALLY EXPOSED TO SANGUINE ELECTROMAGNETIC FIELDS

Bernard Greenberg Mar 1975 20 p refs

(Contract N00039-73-C-0030)

(AD-A008254) Avail NTIS CSCL 06/18

The oxygen consumption and respiratory quotient (RQ) of five species of animals collected adjacent to the Sanguine antenna during summer, 1974, were tested. The species were wood louse, *Oniscus asellus*, the earthworms *Lumbricus terrestris* and *L. rubellus*, slug, *Arion* sp., and redbacked salamander *Plethodon cinereus cinereus*. Controls were collected on the same day, 6 to 13 miles from the nearest Sanguine antenna, and both test and control groups were tested simultaneously. No significant differences were found in the oxygen consumption or RQ between any test and control group of animals. GRA

N75-25537* National Aeronautics and Space Administration Lyndon B Johnson Space Center Houston, Tex

MEDICAL SUPPORT AND FINDINGS OF THE SKYLAB PROGRAM

Richard S Johnston and Lawrence F Dietlein Mar 1975 40 p refs

(NASA-TM-X-58160, JSC-09383) Avail NTIS HC \$3.75 CSCL 06S

Specific equipment used in carrying out Skylab medical experiments is outlined and illustrated. Also included are reviews of the techniques, frequency, and protocols of the tests designed to study the long term effects of weightlessness on the human body. In-flight investigations were an evaluation of the cardiovascular system, a study of metabolic activity investigations in the field of neurophysiology, the determination of changes in body fluids, a precise measurement of total body metabolism, and a study of crew performance by use of a time and motion experiment. Significant data obtained from in-flight and post-flight tests are outlined. Author

N75-25538* Kanner (Leo) Associates, Redwood City, Calif

SALYUT 4 STADIUM IN WEIGHTLESSNESS

A Gorokhov and V Stepanov Washington NASA Jun 1975 7 p Transl into ENGLISH from Zarya Vostoka (USSR) 5 Feb 1975 p 4

(Contract NASw-2481)

(NASA-TT-F-16326) Avail NTIS HC \$3.25 CSCL 06P

The physical exercise program for the Salyut-4 crew is presented more systematically and in more detail than in previous reports. The cosmonauts exercise equipment and its use are clearly noted and the daily and weekly exercise regimen is analyzed. Average load is about 450 kilocalories/24 hours. In addition, the program for wearing training load suits and the function of the suits are described. It is recommended that the suits be worn at least 8 hours per day. Author

N75-25539* National Aeronautics and Space Administration Langley Research Center, Langley Station, Va

THERAPEUTIC HAND EXERCISER Patent Application

Donald E Bartholme inventor (to NASA) Filed 3 Jun 1975
15 p
(NASA-Case-LAR-11667-1 US-Patent-Appl-SN-583487) Avail
NTIS HC \$3 25 CSCL 06B

An apparatus is described for cyclic therapeutic exercise of incapacitated hands. It alternately imparts a straightening and bending motion to the fingers by the use of a splint-like inflatable member attached to the top of the hand and a lower pouch in the palm of the hand which pulls a flap tight around the fingertips. The basic operation of the invention in straightening the fingers is described. The upper pouch is inflated causing the fingers which are attached to it by finger loops to be straightened. When the upper pouch is deflated through a valve the lower pouch is inflated and this pulls a flap tight around the fingertips causing them to bend. Alternate inflation and deflation of the upper and lower pouches is accomplished by a pumping system which, by use of a cycling valve assures one pouch is always being deflated while the other is being inflated. NASA

N75-25540*# Boeing Aerospace Co., Houston Tex
A FEASIBILITY STUDY FOR AN EMERGENCY MEDICAL SERVICES SYSTEM TO SERVE THE PERMIAN BASIN IN THE STATE OF TEXAS Final Report
13 May 1975 10 p
(Contract NAS9-14397)
(NASA-CR-141853) Avail NTIS HC \$3 25 CSCL 06E

The development of an Emergency Medical Services System grant application for the Permian Basin Region of West Texas is described along with the application of NASA-developed technology. Conclusions and recommendations are included.

Author

N75-25541*# Scientific Translation Service Santa Barbara Calif
RADIATION SAFETY OF COSMONAUTS
Vitaliy Golovachev Washington NASA 12 Jun 1975 6 p
Transl into ENGLISH from Trud (USSR), 1 Feb 1975 p 2
(Contract NASw-2483)
(NASA-TT-F-16323) Avail NTIS HC \$3 25 CSCL 06R

Radiation monitoring in manned space flight is discussed with reference to the Salyut 4 and Soyuz 9 flights. Solar activity as the major source of dangerous radiation is explained and radiation dosages for the cosmonauts are reported. D M L

N75-25542*# Johns Hopkins Univ Baltimore Md Dept of Environmental Medicine
FATE IN HUMANS OF THE PLASTICIZER, DI (2-ETHYLHEXYL) PHTHALATE, ARISING FROM TRANSFUSION OF PLATELETS STORED IN VINYL PLASTICS BAGS
Robert J Rubin and Charles A Schiffer (Maryland Univ Hospital) 1975 19 p refs
(Contract NAS5-22071)
(NASA-CR-143802) Avail NTIS HC \$3 25 CSCL 06E

Platelet concentrates were shown to contain 18-38 mg/100 ml of a phthalate plasticizer (DEHP) which arose by migration from the vinyl plastic packs in which the platelets were prepared and stored. Transfusion of these platelets into 6 adult patients with leukemia resulted in peak blood plasma levels of DEHP ranging from 0.34 - 0.83 mg/100 ml. The blood levels fell mono-exponentially with a mean rate of 2.83 percent per minute and a half-life of 28.0 minutes. Urine was assayed by a method that would measure unchanged DEHP as well as all phthalic acid-containing metabolites. In two patients, at most 60 and 90% of the infused dose respectively, was excreted in the urine collected for 24 hours post-transfusion. These estimates however could be high due to the simultaneous excretion of DEHP remaining from previous transfusions or arising from uncontrolled environmental exposures. Author

N75-25543# Medical Physics Inst Utrecht (Netherlands)
[RESEARCH ACTIVITIES IN APPLICATION OF PHYSICS AND ENGINEERING TO MEDICAL SCIENCE AND PROBLEMS]
B VanEijnsbergen, ed and F L LopesdaSilva, ed Dec 1974
228 p refs
(PR-4) Avail NTIS HC \$7 00

Studies in neuromuscular training and prostheses for handicapped, hemodynamic measurements, coronary arteriography, monitoring of cardiac and psychiatric patients, electrocardiography and electroencephalography data processing and integration and human and animal electrophysiology are reviewed.

N75-25544 Medical Physics Inst Utrecht (Netherlands)
FUNCTIONAL NEUROMUSCULAR TRAINING EMG BIOFEEDBACK

H H Kwee, B Venkatesh and R Soerjanto. *In its Res Activities in Appl of Phys and Eng to Med Sci and Probl* Dec 1974 p 13-17 refs

The role of preprogrammed action patterns in neuromuscular control is stressed and a simplified scheme of the learning process to establish such programs is formulated. The potential of biofeedback techniques for the formation of new action programs when the old ones have failed due to pathological changes of the motor system is discussed. In particular, the use of electromyography feedback as an aid for the functional neuromuscular training in rehabilitation is considered and the design concepts of two instruments for this purpose are discussed.

Author (ESRO)

N75-25545 Medical Physics Inst Utrecht (Netherlands)
MYOELECTRIC TRAINING OF CONGENITAL BELOW-ELBOW STUMPS IN CHILDREN

R Soerjanto. *In its Res Activities in Appl of Phys and Eng to Med Sci and Probl* Dec 1974 p 18-22 refs

Rudimentary forearm muscles of children with congenital absence of a hand and of part of the forearm may after special exercises be used to control a myoelectric hand prosthesis. The children must be able to activate at least two rudimentary muscles or muscle groups independently of one another with the signals of the action potentials of these muscles or muscle groups that are derived from the skin of the stump electrically influencing one another little or not at all. Of the nine children trained five were fitted with a myoelectric prosthesis. The technique and duration of the training, the equipment used and the method of recording the training scores are discussed. The indications and the reasons why a prosthesis should be fitted at the earliest possible age are given. Author (ESRO)

N75-25546 Medical Physics Inst Utrecht (Netherlands)
VACUUM DELATENCY CASTING FOR THE CONSTRUCTION OF INDIVIDUALLY MOLDED SEATS

F H Germans, M W Koster, H H Kwee, N VdMey, R Soerjanto, and D W Wijkman. *In its Res Activities in Appl of Phys and Eng to Med Sci and Probl* Dec 1974 p 23-29 refs

Merits of vacuum dilatancy casting (VDC) technique for the production of faithful body impressions of patients suffering from sitting problems are discussed. Impressions are taken with the patients seated in the desired posture. A summary of the first 15 individual seats which were constructed according to body casts made with the VDC technique is presented. The range of potential applications for this technique includes, among others, prevention of decubitus, postural correction, postural support, and improvement of stability. Author (ESRO)

N75-25547 Medical Physics Inst Utrecht (Netherlands)
FUNCTION OF THE LOWER BACK IN MAN MEASUREMENT TECHNIQUE FOR RESEARCH INTO LOW BACK PAIN

J During, H Goudrooy and T W Beeker. *In its Res Activities in Appl of Phys and Eng to Med Sci and Probl* Dec 1974 p 30-39 refs

Complaints from low back pain patients are usually vague and nonspecific. The bio-mechanical functioning of the lower back in humans was studied. A description of a measurement method for the analysis of the behavior of the lower back as a component of the overall biomechanical behavior of the whole body is given. The system in and around the lower back is very complicated so that an investigation of this system involves many parameters. A measurement technique in which mechanical

measurements are combined with electromyographic measurements is employed. Registrations of sagittal flexion and extension of healthy persons show a characteristic movement pattern which can be used as a basis for comparison with corresponding patterns of patients with low back pain. Author (ESRO)

N75-25548 Medical Physics Inst Utrecht (Netherlands)
THE CARDIAC OUTPUT COMPUTER (COC) PROJECT

K H Wesseling, B DeWit, J A P Weber, and J E W Beneken
In its Res Activities in Appl of Phys and Eng to Med Sci and Probl Dec 1974 p 44-50 refs

Cardiac output being the amount of blood pumped by the heart in liters per minute, a simple inexpensive computer (COC) was devised for displaying the value of cardiac output at every beat in addition to stroke volume, heart rate, and mean arterial pressure in numerical form. The input required from the patient is a continuous arterial blood pressure signal which can only be obtained by invasive techniques. A pulse contour method is used for computing the continuous beat-to-beat value for cardiac output. The method is based on the transmission line theory—especially on the pressure-flow relationship—and an analog simulation is used for verifying hypotheses. The COC should be used for early warning systems in intensive care units or as a monitor during anesthesia. ESRO

N75-25549 Medical Physics Inst Utrecht (Netherlands)
A METHOD FOR THE QUANTITATIVE EVALUATION OF THE HEMODYNAMIC EFFECT OF OBSTRUCTIONS IN THE CORONARY ARTERIES AS DEMONSTRATED BY CORONARY ARTERIOGRAPHY

K H Wesseling, P Kloppenburg (Saint Antonius Hosp), and A V G Bruschke (Saint Antonius Hosp)
In its Res Activities in Appl of Phys and Eng to Med Sci and Probl Dec 1974 p 51-59 refs

A method is described by which it is possible to quantitatively evaluate coronary cineangiograms with respect to the influence of the size of the various coronary arteries and their obstructions on regional myocardial blood flow distribution. The method was tested in five coronary patients, one of which had atheromatous obstructions in one of the coronary arteries. Results compare to what is reported in the literature on myocardial blood flow distribution using different methods. Author

N75-25550 Medical Physics Inst Utrecht (Netherlands)
SYSTOLIC TIME INTERVALS: THE EVALUATION OF A METHOD FOR CLINICAL DIAGNOSTIC USE
 J J H Donders, G M A VanderHoeven, B Snoek, and R Kruizinga
In its Res Activities in Appl of Phys and Eng to Med Sci and Probl Dec 1974 p 60-69 refs

The measurements of systolic time intervals (STI) during exercise is a provocative method which is useful in the diagnosis of cardiac function. The method is described and results of a clinical evaluation on normals and patients are given. About 80% of the cardiac patients with various stages of coronary artery disease and/or abnormal left ventricular contraction patterns are diagnosed correctly with almost no false positives. A preprocessing unit to facilitate the measurement and to improve the signal-to-noise ratio and a digital computer program for the automatic recognition of the signals were developed. A program for the localization of the onset of ventricular depolarization (Q wave in ECG) is written but has to be evaluated for more different wave shapes. Maxima in the (approximate) second derivative of the carotid pulse indicate, within certain constraints, localization of upstroke and incisura. The ejection time is estimated with a standard deviation of 7 msec with no systematic absolute error or any systematic error related to the RR interval. Parameters derived from the STI during exercise are evaluated to determine their diagnostic value. Author (ESRO)

N75-25551 Medical Physics Inst Utrecht (Netherlands)
MONITORING AND CONTROL ASPECTS DURING HAL-

OTHANE ANESTHESIA: SOME RESULTS OF COMBINED MODEL SIMULATION AND ANIMAL EXPERIMENTS

A Zwart and A VanDieren
In its Res Activities in Appl of Phys and Eng to Med Sci and Probl Dec 1974 p 70-82 refs
 Sponsored in part by Hoechst Co

Sinusoidal, step and pulse wise changes in halothane concentration were used to study the dynamic behavior of cardiovascular variables and EEG. The brain perfusion was studied with Xe-133. A noninvasive technique which uses sinusoidal inputs to determine lung perfusion was introduced. A linear relationship was found between changes in stroke volume and changes in the halothane concentration in the spinal cord. The observation of oscillatory behavior in the Xe-133 washout curves resulted in a modification of the model for brain perfusion. This model can also explain the observed behavior of the EEG and the overshoot in the halothane concentration in the venous drain of the brain. Author (ESRO)

N75-25552 Medical Physics Inst Utrecht (Netherlands)
EEG SIGNS OF CEREBROVASCULAR INSUFFICIENCY: AN APPLICATION OF SPECTRAL ANALYSIS OF THE EEG USING PROVOCATIVE METHODS

A Kamp and J Troost
In its Res Activities in Appl of Phys and Eng to Med Sci and Probl Dec 1974 p 86-92 refs

A group of patients suffering from cerebrovascular insufficiency was submitted to a neurophysiological investigation. Their EEG was recorded at rest and during physical and mental activity. Two control normal groups, one of young (20 to 30 years) and another older (> 50 years) subjects, were also investigated. The EEGs were submitted to quantitative analysis by means of spectral analysis. Parameters which offered the best chance of differentiating the group of patients from the normals were determined. Deviations from normal emerged particularly when using provocative methods and they were mainly revealed in the form of a decrease in alpha frequency. The value of this pilot study for clinical use is discussed. Author (ESRO)

N75-25553 Medical Physics Inst Utrecht (Netherlands)
THE MESODIENCEPHALIC HIPPOCAMPAL SYSTEM: A QUANTITATIVE ANALYSIS OF THE MODULATION OF THETA RHYTHM

T Paiva, F H LopesdaSilva, W Mollevanger, and C VanHulten
In its Res Activities in Appl of Phys and Eng to Med Sci and Probl Dec 1974 p 93-103 refs
 Sponsored in part by Found for Fundamental Med Res (FUNGO) and Sci Council of North Atlantic Treaty Organ

The hippocampal responses to stimulation of several mesodiencephalic inputs were quantitatively investigated in seven cats with chronically implanted electrodes. Noise modulated pulses were used for stimulation of the different input areas so that a system analysis approach could be followed. The hippocampal EEG was analyzed by spectral analysis. Phase and coherence functions and time delays between input signal and output EEG were computed. The rhythmic activity of the hippocampus increased as a function of stimulus strength. Characteristic response patterns were described for each input area. These differed as regards the occurrence of shifts in theta peak frequency and the decrease in one or more theta frequency components below baseline levels at high stimulation voltage. Desynchronization (flat EEG spectrum) of hippocampal EEG took place with stimulation of the medial septum or with electrodes placed in the neighborhood of fiber tracts. The effects of carrier frequency and of modulation depth were investigated in detail. Linear phase relations between input and output were found, allowing the computation of delays between the stimulation area and the hippocampus response. These time delays differed according to the area of stimulation. The magnitude of the delay times suggests the existence of polysynaptic pathways arising in mesodiencephalic areas which are responsible for the generation of theta rhythm in the hippocampus. Author (ESRO)

N75-25554 Medical Physics Inst Utrecht (Netherlands)
FIELD POTENTIALS IN THE DENTATE AREA OF THE CAT
EXPERIMENTAL FINDINGS AND BIOPHYSICAL MODELS

A VanRotterdam, A Habets, and W Wouters *In its Res Activities in Appl of Phys and Eng to Med Sci and Probl* Dec 1974 p 104-113 refs

Potentials evoked by electrical stimulation of the perforant path were recorded in the dentate area of the cat. In order to understand the generation of these evoked potentials, computer simulations were performed. The computer model described the membrane potentials as well as the extracellular propagation of currents. By comparison of experiments and model simulations, it was confirmed that the assumptions concerning the geometry and electrical properties of the granular cell supported the current hypotheses concerning the electrical fields of the extracellular EPSPs and the population spike. The hypothesis that the late component in the evoked potential is a sign of somatic inhibition could not be supported by the model results. An alternative hypothesis for this component was put forward, namely that it seems more probably that the granular cells are recurrently excited by means of the basket cells. The model can be extended to studies of the generation of more complex potentials evoked in population of neurons. Author (ESRO)

N75-25555 Medical Physics Inst Utrecht (Netherlands)
MOTOR CORRELATES OF OPERANTLY REINFORCED
HIPPOCAMPUS THETA SHIFTS

D E A T Arnolds, F H LopesdaSilva, A Kamp and W Aitink *In its Res Activities in Appl of Phys and Eng to Med Sci and Probl* Dec 1974 p 114-120 refs. Sponsored in part by Found for Fundamental Med Res (FUNGO)

Dogs which are given a food reward each time the peak frequency of their hippocampal theta rhythm shifts to a value higher than 5.4 or 5.5 Hz will produce many more theta shifts per unit of time than before they were rewarded. Thus, the probability of the occurrence of theta shifts can be increased by their operant reinforcement. The behavior related to the theta shifts was assessed quantitatively. Significantly associated with the theta shifts are transitions in gross motor activity and in head position which appear to have the swiftness of the animal's movements in common. It is proposed that behavior correlates of hippocampal theta frequency are found in terms of elementary characteristics of motor acts. Author (ESRO)

N75-25556 Medical Physics Inst Utrecht (Netherlands)
BEHAVIOURAL EFFECTS OF FRONTO-ORBITAL LESIONS
IN DOGS

A M Thielen, H DeGroen, W StormvanLeeuwen, F H LopesdaSilva, and E Bongartz *In its Res Activities in Appl of Phys and Eng to Med Sci and Probl* Dec 1974 p 121-125 refs

Dogs which showed an abnormal level of anxious behavior towards humans were investigated in order to find out whether electrocoagulation of the fronto-orbital and/or cingular brain areas caused a change in that behavioral state. The dog's behavior was quantified according to ethological methods. An operational definition of the dog's anxiety reaction was obtained. It was found that there was no clear change in this respect after coagulation of the lateral fronto-orbital areas, however, the coagulation led to an increase in eating and in motor behavior. Author (ESRO)

N75-25557 Medical Physics Inst Utrecht (Netherlands)
SOME INVESTIGATIONS ON THE ELECTRICAL ACTIVITY
OF THE HUMAN ORBITO-FRONTAL CORTEX

W Vliegthart, A Kamp, and W StormvanLeeuwen *In its Res Activities in Appl of Phys and Eng to Med Sci and Probl* Dec 1974 p 126-132 refs

A neurophysiological study of the orbito-frontal cortex of a psychiatric patient in whom depth electrodes were implanted is reported. Beta bursts were found which are characterized as rhythmic paroxysms with amplitudes between 100 to 250 microvolts within the 14 to 20 Hz band. The occurrence of

these bursts was clearly associated with the performance of mental arithmetic and word association tests. Author (ESRO)

N75-25558 Medical Physics Inst Utrecht (Netherlands)
STEREOTACTIC APPARATUS FOR THE INTRODUCTION
OF ELECTRODES INTO THE BRAIN OF THE HUMAN

A Kamp and H W DeSoete *In its Res Activities in Appl of Phys and Eng to Med Sci and Probl* Dec 1974 p 133-136 ref

A new stereotactic apparatus for the implantation of electrodes in the human brain is described. The apparatus consists of three parts, which are assembled during the course of the operation: (1) base unit rigidly fixed to the operation table; (2) head holder fixed to the skull by means of 4 point-screws; and (3) a trephine guide system providing three-dimensional positioning and guidance for a trephine by means of which bundles of gold wire are introduced. ESRO

N75-25559 Medical Physics Inst Utrecht (Netherlands)
DETECTION OF NONSTATIONARITIES IN EEG'S USING
THE AUTOREGRESSIVE MODEL. AN APPLICATION OF
EEG'S OF EPILEPTICS

F H LopesdaSilva, A Dijk, and H Smits *In its Res Activities in Appl of Phys and Eng to Med Sci and Probl* Dec 1974 p 137-148 refs

The description of EEGs in terms of autoregressive models is theoretically presented as well as the practical problem of determining the order of the adequate model. In this way EEGs are accounted for in terms of a filtered noise. A method for detection of nonstationarities in EEGs is derived by determining the statistical properties of the noise term which results from passing the EEG through the inverse of the corresponding autoregressive filter. The detection method is extended to include a matched filter operation. These methods were applied to EEGs of epileptic patients. In order to evaluate the results of the detection method, it was applied to EEG recordings simultaneously obtained from the scalp and from the deeper tissue by means of implanted electrodes in an epileptic patient. In this way pulse-shaped signals recorded from the scalp and detected by the computer procedure were characterized, some of these were not clinically classified as being of epileptic origin. Simultaneous analysis of depth recordings allowed correlation of these nonstationarities with irritative phenomena recorded from the brain depth. ESRO

N75-25563 Medical Physics Inst Utrecht (Netherlands)
QRS AND ST-T TYPIFICATION

J H VanBemmel and S J Hengeveld *In its Res Activities in Appl of Phys and Eng to Med Sci and Probl* Dec 1974 p 174-181 refs

The typification of ventricular complexes in an ECG recording is of great importance for computer interpretation. For the contour analysis the dominant beat has to be determined, whereas the presence of other waveshapes has to be stated for rhythm analysis. This contribution describes an algorithm for this typification based on the computation of the covariance matrix of the ECG signals after digital filtering. The performance of the method was evaluated with the help of a testing population of electrocardiograms. The algorithm was implemented in a modular system for ECG/VEG processing. Author (ESRO)

N75-25564 Medical Physics Inst Utrecht (Netherlands)
A RELIABLE QRS-DETECTOR FOR CORONARY CARE UNIT
(CCU) MONITORING

C A Swenne, M Hermans, and D Hordijk *In its Res Activities in Appl of Phys and Eng to Med Sci and Probl* Dec 1974 p 182-184 ref. Sponsored by Neth Heart Found

A method for detecting ventricular contractions in an arbitrarily chosen, one-lead electrocardiogram is described. The method is implemented in hardware and is part of a patient monitoring system. The detector was applied to a population of signals; the results are given. Author (ESRO)

N75-25565 Medical Physics Inst Utrecht (Netherlands)
A PILOT SYSTEM FOR MONITORING THE ELECTROCAR-
DIAGRAM IN A CORONARY CARE UNIT

C A Swenne and J S Duisterhout *In its Res Activities in Appl of Phys and Eng to Med Sci and Probl* Dec 1974 p 185-187 refs Sponsored by Neth Heart Found

A computerized monitoring system which was used in a coronary care unit is discussed. The system is able to discriminate between different (ECG) wave forms for one patient and provides warnings and alarms if the condition of the patient deteriorates. Typical for the system is that interactive and adaptive aspects try to take the patient as his own standard of reference.

Author (ESRO)

N75-25566 Medical Physics Inst Utrecht (Netherlands)
STOCHASTIC OPERATIONS ON CCU ELECTROCARDIOGRAMS

C A Swenne and J C Looyen *In its Res Activities in Appl of Phys and Eng to Med Sci and Probl* Dec 1974 p 188-192 ref Sponsored by Neth Heart Found

When analyzing electrocardiograms one is always confronted with the problem of the detection of ventricular (QRS) complexes. A method for optimizing the detection parameters of such a detector intended for operation in a coronary care unit (CCU) is described. Optimization is done with two populations each consisting of 54 different patterns, the results for these two populations are compared. The aim of this method is to find criteria for a good working detector which can be used in a coronary care unit. The detector tested consists of a band pass filter, some preprocessing stage, and five parallel partial detectors. Bandpass filtering is done to remove disturbances in the electrocardiogram caused by respiration (low-frequency) and 50 Hz hum and muscle noise (high-frequency). The cut-off-frequencies of the filters are 8 and 25 Hz, the slopes about 12db/octave. The gain of the filter is chosen in such a way that the maximum amplitude of each QRS complex has a fixed value. Thereafter, the signal is rectified. Each of the five partial detectors consists of a pulse shaper and a candidate shaper.

Author (ESRO)

N75-25567 Medical Physics Inst Utrecht (Netherlands)
A DECISION TREE FOR ARRHYTHMIA DIAGNOSIS AS PART OF A MODULAR VCG/ECG ANALYSIS SYSTEM

J T Hoogakker and H W M Plokker *In its Res Activities in Appl of Phys and Eng to Med Sci and Probl* Dec 1974 p 193-198 refs

A computer program for automatic classification of arrhythmias is described. The program is part of a total modular electrocardiogram/vectorcardiogram analysis system. In addition, a very short description of the module P-wave finder is presented.

Author (ESRO)

N75-25568 Medical Physics Inst Utrecht (Netherlands)
PATIENT MONITORING DURING CARDIAC SURGERY WITH AID OF THE EEG

R A F Pronk and A J R Simons (Saint Antonius Hosp) *In its Res Activities in Appl of Phys and Eng to Med Sci and Probl* Dec 1974 p 199-201 ref.

The electroencephalogram was used during open heart cardiac surgery for patient monitoring. A reduced 10 to 20 system of electrode placement was used consisting of 11 electrodes on the scalp and one ground electrode on the shoulder. The electrode impedance must be smaller than 3 k ohms, and disturbances must be eliminated. Zero crossing histograms and amplitude histograms were continuously determined by a small computer to detect trends in the patient's condition.

ESRO

N75-25569 Medical Physics Inst Utrecht (Netherlands)
SOFTWARE QRS-WAVE DETECTION OF VCG's AND ECG's

R A F Pronk *In its Res Activities in Appl of Phys and Eng to Med Sci and Probl* Dec 1974 p 202-205 ref

A computer program was written for the determination of reference points in QRS-waves of vectorcardiograms and electrocardiograms. The lead systems employed were the Frank

lead system and the standard 12-lead system. The program was applied to lead groups of three simultaneously recorded leads. The results can be used for contour classification as well as for rhythm diagnosis of electrocardiograms.

Author (ESRO)

N75-25570 Medical Physics Inst Utrecht (Netherlands)
PROGRESS IN DIAGNOSING ELECTROCARDIOGRAMS

J L Talmon and G VanHerpen *In its Res Activities in Appl of Phys and Eng to Med Sci and Probl* Dec 1974 p 206-209

Measurements which are used in an automated vectorcardiogram processing system to classify the repolarization of the ventricle are described. Results of a classification program in which these measurements are used for independent patient material are presented.

Author (ESRO)

N75-25571 Medical Physics Inst Utrecht (Netherlands)
THE ST SLOPE

C A Ascoop (Saint Antonius Hosp), C A Distelbrink, and P A DeLang *In its Res Activities in Appl of Phys and Eng to Med Sci and Probl* Dec 1974 210-215 refs

As a part of a larger study about electrocardiography during exercise in ischaemic heart disease the diagnostic value of several ST slope criteria were examined. In a group of 87 patients the results were compared with findings from coronary arteriography. Higher diagnostic scores were reached than according to the conventional criterion of the ischaemic signs in electrocardiograms.

ESRO

N75-25572 Medical Physics Inst Utrecht (Netherlands)
MODULAR SOFTWARE FOR ECG/VCG PROCESSING

J S Duisterhout *In its Res Activities in Appl of Phys and Eng to Med Sci and Probl* Dec 1974 p 216-221 refs

The software architecture of a modular computerized vectorcardiogram/electrocardiogram processing system is described. Design specifications and the reasons for this development are discussed and a short description of all of the modules is given.

Author (ESRO)

N75-25573 Medical Physics Inst Utrecht (Netherlands)
A METHOD FOR DETECTING EPILEPTIC SEIZURES

C VanNimwegen, J Boter and B VanEijnsbergen *In its Res Activities in Appl of Phys and Eng to Med Sci and Probl* Dec 1974 p 224-228 ref

An instrument by means of which epileptic seizures can be detected is described. Vibrations of a bed due to patient movements are converted into electric pulsations by means of a movement-transducer. To distinguish between normal movements and those caused by an epileptic seizure, three criteria are used, namely, the amplitude of pulsations, the time interval between pulsations and the duration of a group of pulsations. Clinical use of the instrument confirms that it satisfactorily meets the requirements.

Author (ESRO)

N75-25574# Rochester Univ, N.Y.
CONSIDERATIONS IN ANIMAL EXPERIMENTATION TO ASSESS BIOLOGIC EFFECTS AND POTENTIAL HAZARDS OF EXPOSURE TO LASERS

S M Michaelson 1974 10 p refs Presented at Working Group on Health Effects from Lasers Dublin 20 Oct 1974 Sponsored by ERDA

(UR-3490-630, Conf-741069-2) Avail NTIS HC \$3.25

Permissible exposure levels to laser energy have been extrapolated from animal data and are based on minimum physical ophthalmoscopic and histologic changes. Uncertainties exist in extrapolation of animal data to humans. Choice of the experimental animal species is of prime importance.

Author (NSA)

N75-25575# Geoscience Ltd Solana Beach, Calif
NERVE REGENERATION SUMMARY PROJECT

H F Poppendiek and D J Connolly Apr 1975 10 p refs (Contract N00014-74-C-0305)

(AD-A008569, GLR-149) Avail NTIS CSCL 06/16

The nerve action potential monitoring concept was tested in the laboratory during in vitro and in vivo experiments using sciatic nerves of frogs and rabbits. Electrode designs were developed which involved piercing of the nerve sheaths thereby making reliable nerve contacts. Methods of electrically insulating electrodes and lead wires were developed which reduced muscle action potential interference. A series of nerve action potential experiments, electrical insulation tests and electrode attachment tests were performed in the laboratory verifying the designs and concepts which are to be tried by the neurosurgeon in NAP monitoring of peripheral nerve regeneration. Over thirty-five electrically insulated stimulating and sensing electrodes were fabricated. Special electrode attachment jigs for nerves were also fabricated. GRA

N75-25576# California Univ Los Angeles Lab of Environmental Neurobiology
AN EVALUATION OF POSSIBLE EFFECTS OF 45 Hz, 60 Hz AND 75 Hz ELECTRIC FIELDS ON NEUROPHYSIOLOGY AND BEHAVIOR OF MONKEYS PHASE 1 CONTINUOUS WAVES

R Gavalas-Medici and S R Magdaleno Apr 1975 301 p refs
 (Contract N00014-69-A-0200-4037)
 (AD-A008404) Avail NTIS CSCL 06/18

Five monkeys were well trained on a Skinnerian schedule in which a five sec interval between responses was reinforced. After a stable level of responding had been achieved, monkeys were exposed to a random series of several electric field configurations with frequencies of 7 Hz, 45 Hz, 60 Hz or 75 Hz and with voltage levels of 1, 10, 56 or 100 V/m p-p. At 1 V/m p-p there was no discernible effect on either behavior or electrical brain waves. (This is approximately 5 times the voltage associated with Project Sanguine.) At 10 V/m there was evidence for a frequency-specific threshold at 7 Hz. Time between responses (interresponse times) was significantly shorter and variability of responding was reduced. When voltage was increased to 56 V/m, direction of the effect was the same as at 10 V/m and the magnitude of the change was markedly increased for both 7 Hz and 75 Hz fields. At 100 V/m there was some evidence for a carry-over effect from one day to the next. GRA

N75-25577# IIT Research Inst Chicago, Ill

ELF COUPLING TO BIOSPHERES

R J Spiegel Mar 1975 27 p refs

(Contract N00039-73-C-0030)

(AD-A008276 IITRI-E6249-3) Avail NTIS CSCL 06/18

The induced fields, currents and power absorbed by spherical models of humans or animals when exposed to ELF electromagnetic fields are calculated in this report. It is shown by a quasi-static approximation that the induced field is comprised of two components: an electric term and a magnetic term. The relative importance of each term is discussed. It is concluded that chronic biological effects of an acute nature (such as body heating or neural activity) are unlikely to occur from ELF electromagnetic fields of low intensity. GRA

N75-25578# Southwest Research Inst San Antonio Tex Army Fuels and Lubricants Research Lab

TOXICITY OF ENGINE EXHAUST GASES DIESEL-BROMOCHLOROMETHANE FUEL BLEND Final Report

Alan A Johnston, Karl Springer, Don Johnson, Dennis Boenig and Frank Newman Feb 1975 40 p refs
 (Contract DAAD05-72-C-0053)

(AD-A008088, AFLRL-51) Avail NTIS CSCL 06/20

A single cylinder diesel engine was used to generate exhaust gases formed during the combustion of diesel fuel containing five percent by vol bromochloromethane, as a fuel additive. An exhaust gas dilution system permitted exposure of selected animal species to the products of combustion diluted with fresh air at air/gas ratios of 10:1, 20:1, 50:1, 75:1 and 100:1. Acute toxicity of the exhaust components in the selected animals was defined during a 4-hr exposure test followed by a 14-day observation period. Histopathology studies of all major organs were also accomplished. Exhaust gas samples were analyzed for organic and inorganic halogen compounds. GRA

N75-25579# Undersea Medical Society, Bethesda, Md
EARLY INDICATIONS OF BEHAVIORAL AND PHYSIOLOGICAL DYSFUNCTIONING IN DEEP DIVES Special Report
 Arthur J Bachrach and Mark E Bradley 20 Mar 1975 39 p
 Presented at the Undersea Medical Society 3d Workshop, San Diego, Calif 3-4 May 1973
 (Contract N00014-74-C-0319)

(AD-A008537 WS-3-30-75) Avail NTIS CSCL 06/19

The report consists of an informal narrative account of discussions based on brief presentations. There were four sessions: (1) Performance Chairman Dr Glen Egstrom, (2) High pressure nervous syndrome Chairman Peter Bennett, (3) Vestibular symptomatology Chairman LCDR Robert S Kennedy, (4) Electroencephalography Chairman Dr Paul Naitoh. GRA

N75-25580# Bureau of Radiological Health Rockville Md
INDEX TO SELECTED ACOUSTIC AND RELATED REFERENCES

Jan 1975 427 p refs

(PB-239805/5 DHEW/FDA-75-8025)

Avail NTIS

HC \$11.25 CSCL 06R

The index to selected acoustic and related references provides a pooled set of references pertaining to the uses, measurement and effects of acoustic energy with special emphasis in the area of ultrasound. It was developed to aid in the retrieval of articles on the subject of acoustic radiation. The document is divided into three sections: KWIC Index, Author Index and Bibliography. GRA

N75-25581*# Kanner (Leo) Associates Redwood City Calif
TWO IN SPACE

Ya Golovanov Washington NASA May 1975 7 p Transl into ENGLISH from Komsomolskaya Pravda (USSR) 4 Feb 1975 p 4

(Contract NASw-2481)

(NASA-TT-F-16325) Avail NTIS HC \$3.25 CSCL 05E

The psychological preparation, testing and analysis of cosmonauts is briefly described. The importance of psychological preparation, especially during longer flights, is stressed. Cosmonauts are under observation from the beginning of the training period; their behavior patterns in grasping a new situation are determined. The interrelationship of the Soyuz-11 crew members (who died during reentry) and the Soyuz-14 crew is mentioned, and the sound psychological preparation of cosmonauts Gubarev and Grechko is pointed out. In both Gubarev's and Grechko's psychological profiles, accurate self-conception and high levels of interiorization and neuropsychological tolerance are noted. Author

N75-25582*# National Aeronautics and Space Administration Langley Research Center, Langley Station Va

VIBRATIONS TRANSMITTED TO HUMAN SUBJECTS THROUGH PASSENGER SEATS AND CONSIDERATIONS OF PASSENGER COMFORT

Jack D Leatherwood Washington Jun 1975 56 p refs

(NASA-TN-D-7929, L-9872) Avail NTIS HC \$4.25 CSCL 05S

An experimental study was conducted to determine the vertical and lateral vibration-transmission characteristics of several types of transport vehicle seats (two aircraft and one bus) to obtain preliminary estimates and comparisons of the ride acceptability of the various seat types. Results of this investigation indicate that from the standpoint of human comfort the seats exhibit undesirable dynamic response characteristics. Amplification of floor vibrations occurred at the frequencies known to be most critical for human comfort in both vertical and lateral axes. An average transmissibility function for aircraft seats was tabulated together with the associated variability for use by designers who incorporate similar types of seats in their vehicles. The acceptability of vibrations resulting from floor inputs of 0.10g and 0.15g was low over a broad range of frequencies for both axes and all seat types, and was especially low at frequencies where the input was being amplified. Author

N75-25583# Institute for Defense Analyses Arlington Va
TRAINING OF US AIR TRAFFIC CONTROLLERS Final Report

James H Henry Murray E Kamrass Jesse Orlansky Thomas C Rowan, Joseph String, and R E Reichenbach Jan 1975 279 p refs

(Contract FA-74-WAI-446)

(AD-A006603/5 R-206) Avail NTIS HC \$8 75 CSCL 05/9

The evolution of national programs for air traffic controller training are reviewed and controller selection and training programs are examined along with methods available to measure performance and to establish competence on the job. The role of standardization and quality control is then addressed. The capabilities and limitations of existing simulation devices for air traffic control training are considered. Alternative ways of meeting the training needs of developmentals are identified and compared on a cost basis. Attention is given to (a) simulators and centralized and noncentralized training (b) the training budget (c) future requirements of training (d) R and D for training (e) hiring practices (f) standardization, and (g) the training load at the FAA Academy. GRA

N75-25584# Virginia Polytechnic Inst and State Univ Blacksburg

VISUAL SEARCH AND IMAGE QUALITY Interim Report, 15 Jun 1971 - 15 Mar 1973

Harry L Snyder Robin Keese William S Beamon and James R Aschenbach Oct 1974 126 p refs

(Contract F33615-71-C-1739 AF Proj 7183)

(AD-A008007 AMRL-TR-73-114) Avail NTIS CSCL 05/5

Several experiments were conducted to evaluate alternate unitary measures of video line-scan system image quality. A metric based upon the Modulation Transfer Function of the imaging system was derived, with emphasis placed upon the photometric properties of the system. This metric was shown to predict well the average effects of several imaging system parameters upon the ability of observers to extract information from both dynamic and static images. In attempting to predict the ability of observers to acquire specific targets in an air-to-ground search task, however, other target and background parameters become very important, and such image quality measures must therefore be refined. Relationships among alternate measures of line-scan image quality were discussed and a conceptual model was presented for combining system noise raster interference scene content and the visual requirements of the observer. GRA

N75-25585# BioTechnology, Inc Falls Church, Va
A REVIEW OF RECENT LITERATURE MEASUREMENT AND PREDICTION OF OPERATIONAL FATIGUE Final Report

Vita West and James F Parker Jr Feb 1975 80 p refs

(Contract N00014-74-C-0225, NR Proj 201-067)

(AD-A008405) Avail NTIS CSCL 06/19

The report presents an overview and selected bibliography, of recent research dealing with the measurement and prediction of fatigue and stress. The impetus for this review is the need by military medical personnel for procedures which might be used to evaluate operational fatigue during periods of sustained operations. Of most interest are those techniques which can ultimately be easily implemented in a field setting. Two broad lines of investigation are being followed in current stress research. Investigators are generally attempting to identify either neurosensory or biochemical correlates of fatigue. Fatigue studies have failed to demonstrate conclusively a high positive correlation between subjective fatigue and work decrement. Performance can be maintained within certain limits in spite of limited sleep and high subjective fatigue. GRA

N75-25586# Human Resources Research Organization, Alexandria, Va

A REPORT OF HUMRRO ACTIVITIES IN SUPPORT OF PROJECT HITVAL

Robert D Baldwin Albert L Kubala Robert Foskett J., and Leo C Benson Jan 1975 66 p

(Contract DAAD05-73-C-0510)

(AD-A008277 HumRRO-RP-WD(TX)-75-3) Avail NTIS CSCL 05/9

The report describes activities dealing with human factors principles in the preparation and conduct of HITVAL, a Department of Defense field test evaluating the effectiveness of selected antiaircraft gun systems. The test evaluated hit probabilities for four types of non-U S antiaircraft guns firing and fixed and rotary wing aircraft. A task analysis was conducted of the crew positions of each gun system providing a basis for determining the basic psychological skills and the visual and psychomotor skills required for each duty position. Tests were obtained or designed to test individual skills and questionnaires were designed to obtain self ratings, peer ratings and supervisor ratings of motivation and morale factors. To assist in assigning the crews for the field test, psychological abilities of each potential crewman were compared with the skills judged to be critical for successful performance of each duty position. GRA

N75-25587# Design Plus St Louis Mo
BEHAVIORAL TAXONOMY OF UNDERGRADUATE PILOT TRAINING TASKS AND SKILLS TAXONOMY REFINEMENT, VALIDATION AND OPERATIONS, PHASE 2 Interim Report, Nov 1973 - May 1974

Robert P Meyer, Jack I Laveson Neal S Weissman and Edward E Eddowes Dec 1964 215 p refs

(Contract F41609-73-C-0040 AF Proj 1123)

(AD-A008201 AFHRL-TR-74-33(III)) Avail NTIS CSCL 05/9

The objective is to analyze and specify the fundamental flying abilities which comprise the training objectives of Undergraduate Pilot Training (UPT). The results of this study will be used as a basis for structuring research on and recommendations for improvements in Air Force flying training programs. The flight training maneuvers of UPT were analyzed according to a breakdown of task elements into the cues, mental actions and motor actions required to accomplish them. Flying tasks analyzed were found to fall into three categories: fundamental transitions, composite transitions and continuous transitions. A set of classification rules were developed to locate any flying training task element in a specific pigeon hole within a taxonomic cubic structure with a cue, motor actions and mental actions serving respectively as the vertical, horizontal and depth axes of the cube. During this phase of the study, 22 additional flight tasks were analyzed supplementing the 14 tasks analyzed previously. All the tasks analyzed were classified and the resulting skill data were further categorized according to a hierarchy of taxonomic rules. The taxonomic hierarchy was adapted to a matrix system of information categorization which was found to provide for simplified data retrieval. GRA

N75-25588# Deutsche Gesellschaft fuer Luft- und Raumfahrt Cologne (West Germany)

BEHAVIORAL MODELS OF THE PILOT

1974 104 p refs. In GERMAN, ENGLISH summaries. Proc of the 15th Meeting of the DGLR Comm on Human Factors Eng, Meckenheim West Ger 18 Apr 1974

(DLR-Mitt-74-42) Avail NTIS HC \$5 25 DFVLR, Porz, West Ger DM 43 50

Topics in the field of behavioral models of human operators are dealt with. The application of the algorithm theory to derive a behavioral model for a flight control and safety operator is considered. A survey is given of various approaches to the description of pilot control behavior. The necessity for time variance was investigated for behavioral models and several limits of validity of these models were examined. A literature study of several physiological stress models based on various theories is presented.

N75-25589 Technische Hochschule Darmstadt (West Germany) Inst fuer Arbeitswissenschaft

ALGORITHM-THEORETICAL BEHAVIORAL MODEL FOR FLIGHT CONTROL AND FLIGHT SAFETY ACTIVITIES [ALGORITHM-THEORETISCHES VERHALTENSMODELL FUER FLUGFUEHRUNGS- UND FLUGSICHERUNGSTAETIGKEITEN]

H D Reiche. In DGLR Behavioral Models of the Pilot 1974 p 7-15 refs. In GERMAN

The application of the algorithm theory to derive a behavioral model for a flight control and safety operator is discussed. In order to obtain such a model the following limiting criteria in the operation are considered: a complete alphabet of operations and logical conditions is produced to allow algorithmic representation of the tasks, all operations and conditions need to be unambiguously defined, and the execution of each operation should be unambiguous, and the operator should know the operations and conditions in the alphabet. The possibilities of this model within these restrictions are examined. ESRO

N75-25590 Forschungsinstitut fuer Anthropotechnik Meckenheim (West Germany)

TWO ASPECTS OF FEEDBACK CONTROL PILOT DESCRIPTIONS VALIDITY RANGE AND MODEL EVALUATION [ZWEI ASPEKTE REGELUNGSTECHNISCHER PILOTEN-BESCHREIBUNGEN GÜLTIGKEITSBEREICH UND BEURTEILUNG DER MODELLIERUNG]

W Stein / In DGLR Behavioral Models of the Pilot 1974 p 17-38 refs In GERMAN ENGLISH summary

Various approaches to the description of pilot control behavior are surveyed, including some aspects of requirements and applications. A set of experiments is described using a single axis manual control with elementary control loops and stationary stochastic forcing functions as a simple control example that can easily be modeled. A selection of previous quasi-linear operator behavior descriptions as well as current experimental results are summarized and compared. The variability of transfer characteristics and the model errors obtained are described so that the validity of the approach in application to other and more complex models can be assessed. Author (ESRO)

N75-25591 Technische Hochschule, Darmstadt (West Germany) Inst fuer Arbeitswissenschaft

CONCEPT OF A FEEDBACK CONTROL BEHAVIORAL MODEL FOR PHYSIOLOGICAL ASPECTS OF VEHICLE GUIDANCE

E Haider and H Luczak / In DGLR Behavioral Models of the Pilot 1974 p 39-52 refs In GERMAN, ENGLISH summary

The necessity for time variance was investigated for behavioral models of operators. A multidimensional physiological method is presented to describe the transformation in time, and is validated in a simulated vehicle driving task. A time variant model for the human operator was developed based on results of analyses of physiological time series, and was simulated on a digital computer. ESRO

N75-25592 Technische Universitaet, Munich (West Germany) Inst fuer Arbeitsphysiologie

CONTROL PERFORMANCE BEHAVIOR IN PURSUIT TRACKING DURING THE LEARNING PHASE UNDER MASSSED AND DISTRIBUTED PRACTICE CONDITIONS, INCREASED MOTIVATION BY ADDITIONAL FINANCIAL INCENTIVE, AND AFTER CHANGE OF THE CONTROL ELEMENT PARAMETERS [REGELLEISTUNGSVERHALTEN BEI PURSUIT TRACKING WAEREND DER ANLERNPHASE UNTER MASSIERTEN UND VERTEILTEN UEBUNGSBEDINGUNGEN, ERHOEHETER MOTIVATION DURCH ZUSAETZLICHE MONETAERE ANREIZE UND NACH DER AENDERUNG VON KENNGROSSEN DES BEDIENELEMENTS]

Helmut Strasser and Alon Adler / In DGLR Behavioral Models of the Pilot 1974 p 53-66 refs In GERMAN

Several limits of the validity of behavioral models were examined. The effects of learning curves for various input signals of constant and quasi-constant difficulty coefficients, and adaptive progressive and regressive varying input frequencies are pointed out. The effects of several financial incentives, distributed and massed practice, a placebo, and the variation of the characteristics of the control element for positional control were measured. The results underline the hypothesis that adaptively varying control characteristics, and increased motivation lead to the human being going to the limit of his performance. ESRO

N75-25593 Technische Hochschule, Darmstadt (West Germany) Inst fuer Arbeitswissenschaft

STRESS MODELS [BELASTUNGSMODELLE]

H Luczak / In DGLR Behavioral Models of the Pilot 1974 p 67-95 refs In GERMAN

A literature study of several physiological stress models, based on various theories is presented. ESRO

N75-25594* National Aeronautics and Space Administration Lyndon B Johnson Space Center, Houston, Tex

IODINE GENERATOR FOR RECLAIMED WATER PURIFICATION Patent Application

Richard A Wynveen (Life Systems Inc., Cleveland) James D Powell (Life Systems, Inc Cleveland) and Franz H Schubert, inventors (to NASA) (Life Systems Inc., Cleveland) Filed 25 Apr 1975 13 p

(Contract NAS1-11765)

(NASA-Case-MSC-14632-1 US-Patent-Appl-SN-571459) Avail NTIS HC \$3 25 CSCL 06K

An electro-chemical iodine valve was designed to be operated by an electrical current in response to detection of iodine levels in the water supply. Additional iodine is injected into the water system in precise and controlled amounts so that a preset residual concentration of iodine in the water supply may be maintained. The iodine generator includes a sensor which electronically detects the iodine level in the water, and produces a correction current control. The correction current control causes the electro-chemical iodine valve to release iodine from the iodine accumulator into the iodine dispenser. The valve operates at a power of 10 mWatts and the system uses recycled water. NASA

N75-25595* Kanner (Leo) Associates, Redwood City, Calif **THE SPACE KITCHEN DISCUSSIONS BETWEEN SCIENTISTS AND READERS**

Ya Gorokhovatskiy Washington NASA May 1975 7 p Transl into ENGLISH from the book Kosmicheskaya kuhnya Besedy uchonykh s chitatel'nyami" Pravda 5 Feb 1975 p 2

(Contract NASw-2481)

(NASA-TT-F-16322) Avail NTIS HC \$3 25 CSCL 06H

Water and food regeneration in closed cycle life support systems for long duration space flights are discussed. A water regeneration system has already been developed and tested, three subjects lived one year on regenerated water. However, a food regeneration system has not yet been developed. Various possible processes are suggested for transforming the carbon dioxide, hydrogen and oxygen available in a spacecraft into edible carbohydrates. The main problem is implementation of the reaction of formaldehyde condensation into carbohydrates which could be assimilated by the body. Author

N75-25596* Minnesota Univ Minneapolis Space Science Center

ENVIRONMENTAL MICROBIOLOGY AS RELATED TO PLANETARY QUARANTINE Semiannual Progress Report Irving J Pflug Dec 1974 59 p refs

(Grant NGL-24-005-160)

(NASA-CR-142933 SAPR-13) Avail NTIS HC \$4 25 CSCL 06M

Continued experimental work related to dry heat resistance of microorganisms. One phase of this research has been concerned with the viability and dry heat resistance of indigenous microflora associated with small soil particles. The second part of this report is an analysis of the present status of dry heat sterilization. An attempt is made to integrate results for both laboratory grown spores and spores in soil. Author

N75-25597* Scientific Translation Service Santa Barbara, Calif **THE HOUSE IN ORBIT**

I Chesanova Washington NASA 12 Jun 1975 9 p Transl into ENGLISH from Leningr Pravda (Leningrad), 31 Dec 1974 p 2

(Contract NASw-2483)

(NASA-TT-F-16328) Avail NTIS HC \$3 25 CSCL 06K

The automatic life support system on biosatellites Cosmos 605 and Cosmos 690 is described. White rats in both satellites were housed in individual two-level houses about the size of the average transistor radio. The animal lived in the upper level, while the lower was used for automatic waste collection. Each compartment had a circuit acting as an induction coil to register the animal's movements. Ventilation, food, and water (every 6 hours), and light (from 8 00 - 16 00 hours) were automatically provided. If the animal showed no movement for 24 hours, services were stopped and its compartment was hermetically sealed. A special switch control unit directed the equipment: a total of 22 000 commands were given for Cosmos 605. Cosmos 690 design was basically the same, however, since the effect of radiation in weightlessness was being studied, an artificial radiation source was installed. Author

N75-25598*# National Aeronautics and Space Administration Pasadena Office, Calif
CATHETER TIP FORCE TRANSDUCER FOR CARDIOVASCULAR RESEARCH Patent Application
 Cyril Feldstein (JPL), Gilbert W Lewis (JPL), Robert H Silver (JPL), and Virgil H Culler inventors (to NASA) (JPL) Filed 16 May 1975 11 p
 (Contract NAS7-100)
 (NASA-Case-NPO-13643-1, US-Patent-Appl-SN-578241) Avail NTIS HC \$3 25 CSCL 06B

A force transducer for measuring dynamic force activity within the heart of a subject essentially consisting of a U-shaped beam of low elastic compliance material is proposed. Two tines extend from the beam's legs and a long coil spring is attached to the beam. A strain gauge is coupled to one of the beam's legs to sense deflections thereof. The beam with the tines and most of the spring are surrounded by a flexible tube, defining a catheter which is insertable into a subject's heart through an appropriate artery. The tines are extractable from the catheter for implantation into the myocardium by pushing on the end of the spring which extends beyond the external end of the catheter. The tines are retractable back into the catheter, prior to catheter removal from the subject, by pulling on the externally exposed spring end. NASA

N75-25599*# National Aeronautics and Space Administration Lyndon B Johnson Space Center Houston, Tex
SKYLAB VECTORCARDIOGRAPH SYSTEM DESCRIPTION AND IN FLIGHT OPERATION
 John Lintott and Martin J Costello (Martin Marietta Corp., Denver, Colo.) Washington Jun 1975 20 p refs
 (NASA-TN-D-7997 JSC-S-437) Avail NTIS HC \$3 25 CSCL 06B

A vectorcardiograph system was used to measure cardiac electrical activity of Skylab crewmen. This system was chosen because of its data-quantification advantages. The vectorcardiograph was required to meet recommended American Heart Association specifications, to withstand space environmental extremes, and to facilitate data gathering in the weightless environment. The vectorcardiograph system performed without failure, and all projected data were acquired. The appendix lists the design specifications used for the Skylab vectorcardiograph system. Author

N75-25600# Atomic Energy Commission Washington, D C
DRAFT GENERIC ENVIRONMENTAL STATEMENT ON THE WIDE-SCALE USE OF PLUTONIUM POWERED CARDIAC PACEMAKERS
 Jan 1975 202 p refs
 (TID-26718) Avail NTIS HC \$7 25

Nuclear-powered cardiac pacemakers were developed which use plutonium (primarily the Pu-238 isotope) as a heat source in a thermoelectric converter battery. The relatively long half-life of Pu-238 (87.8 y) provides batteries with longer service life than conventional batteries and reduces the need for pacemaker reimplantations, thus reducing the surgical risk, pain, suffering, and anxiety associated with replacement surgery. This environmental impact statement considers the radiation safety standards which nuclear pacemakers are required to meet, the benefits to patients from the longer useful life of nuclear powered pacemakers,

alternative pacemakers that are available or being developed, and the risks to the public and to the environment from the use of plutonium powered pacemakers. NSA

N75-25601# Army Test and Evaluation Command, Aberdeen Proving Ground, Md
LABORATORY VIBRATION SCHEDULES Common Test Operations Procedures
 20 Mar 1975 29 p refs Revised
 (AD-A008234, TOP-1-2-601) Avail NTIS CSCL 15/5

Provides schedules for conducting laboratory vibration tests of Army materiel and discusses selection of schedules. Covers simulated logistical transportation of secured cargo and tactical transportation of equipment installed in ground vehicles and helicopters and mounted externally on helicopters. Schedules include vibration levels, frequencies, and test time for various simulations. GRA

N75-25602# Army Natick Labs., Mass Clothing Equipment and Materials Engineering Lab
LAMINATES FOR BALLISTIC PROTECTION Technical Report, Jul - Dec 1974
 Roy C Laible and Maurice R Denommee Feb 1975 16 p refs
 (DA Proj 1T7-62723-AH-98)
 (AD-A008020, CE/MEL-140, USA-NLABS-TR-75-76-CE) Avail NTIS CSCL 19/4

Kevlar 29 and fiberglass laminates were ballistically evaluated with 9 mm projectiles to determine their ability to protect against severe hand gun threats. The Kevlar laminates exhibit an advantage over the glass laminates, providing complete protection against 9 mm projectiles up to 395 m/sec at an areal density of 7.3 kg/square meter. The glass laminates allowed some complete penetrations even at a higher areal density. GRA

N75-25603# Computer Corp of America, Cambridge, Mass
BIOCYBERNETICS PROJECT Final Report, 30 Jun 1973 - 31 Dec 1974
 Jeffrey M Hill 31 Dec 1974 21 p refs
 (Contract DAHC15-73-C-0320)
 (AD-A008209) Avail NTIS CSCL 06/4

CCA's biocybernetics effort had two major parts: support of the ARPA biocybernetics community and a research program focusing on EEG correlates of attention. In the area of cybernetics community support, CCA has funded a successful pilot effort to share data and analysis tools using the ARPA network. In its own research, CCA has demonstrated the feasibility of using evoked potential experiments to study a model of human learning. GRA

N75-25604*# National Aeronautics and Space Administration, Washington, D C
OBJECTIVES AND MODELS OF THE PLANETARY QUARANTINE PROGRAM
 Morton Werber 1975 140 p refs
 (NASA-SP-344 LC-74-600023) Avail NTIS MF \$2 25 SOD HC \$2 10 CSCL 06C

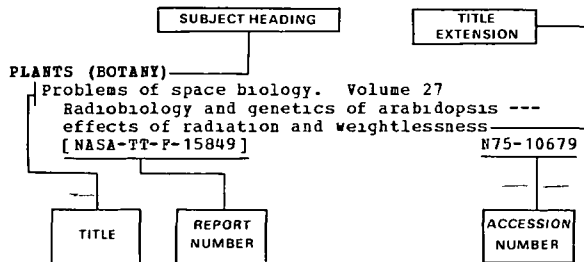
The objectives of the planetary quarantine program are presented and the history of early contamination prevention efforts is outlined. Contamination models which were previously established are given and include determination of parameters, symbol nomenclature, and calculations of contamination and hazard probabilities. Planetary quarantine is discussed as an issue of national and international concern. Information on international treaty and meetings on spacecraft sterilization quarantine standards, and policies is provided. The specific contamination probabilities of the U S S R Venus 3 flyby are included. LB

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AEROSPACE MEDICINE AND BIOLOGY / *A Continuing Bibliography (Suppl 145)*

SEPTEMBER 1975

Typical Subject Index Listing



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- Aerospace Medical Association, Annual Scientific Meeting, San Francisco, Calif., April 28-May 1, 1975, Preprints
A75-34925

- International Symposium on Basic Environmental Problems of Man in Space, 5th, Washington, D.C., November 27-30, 1973, Proceedings
A75-35601

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- Space biology and aerospace medicine, volume 9, no. 2, 1975 [JPRS-64929]
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- Medical support and findings of the Skylab program [NASA-TM-X-58160]
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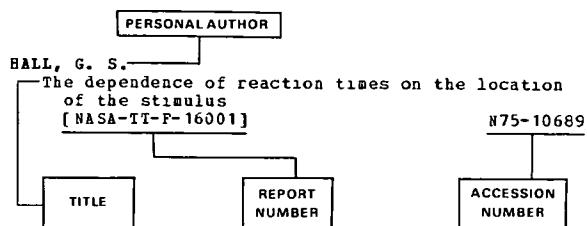
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